JOB #14



345TH AVE SE

359TH AVE SE

373RD AVE SE

R.82.W

 STATE
 PROJECT NO.
 PCN N

 ND
 ROM-0300(129)
 212

PCN NO. SECTION NO. SHIND.

WARD COUNTY, NORTH DAKOTA

ROM-0300(129)

COUNTY ROAD 24 (CMC 5166)

1.5 MI E OF US 83

T151N R83 W SEC 23 & 26

GRADE RAISE, CULVERTS, RIPRAP,

AGGREGATE SURFACING, AND INCIDENTALS

25

36

12

∧ 13

24

28TH ST NW

27TH ST NW

19

11

14

23

MAX POP.334

22

R.83.W

83

GOVERNING SPECIFICATIONS:

2014 STANDARD SPECIFICATIONS ADOPTED BY THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION AND THE SUPPLEMENTAL SPECIFICATIONS EFFECTIVE ON THE DATE THE PROJECT IS ADVERTISED.

PROJECT NUMBER ROM-0300(129)

NET MILES GROSS MILES

ALL ELEVATIONS NAVD 88

END PROJECT ROM-0300(129)
STA 30+00 = A POINT APPROXIMATELY
0.0 FEET EAST AND 8.4 FEET SOUTH OF
THE NORTH QUARTER CORNER OF
SEC. 23, TWP. 151 N., RGE. 83 W

BEGIN PROJECT ROM-0300(129) -STA 4+40 = A POINT APPROXIMATELY 74.7 FEET EAST AND 0.2 FEET SOUTH OF THE NORTHWEST CORNER OF SEC. 26, TWP. 151 N., RGE. 83 W

WARD COUNTY

MC LEAN COUNTY

LA MOURE

STATE COUNTY MAP

OLIVER

MC KENZIE

SLOPE

DESIGNERS

DAVID WOOD, PE LEVI HELLER, PE

JONATHAN BACH, PE DAIN SYNHORST

TRAFFIC AVERAGE DAILY

CURRENT 2016 LESS THAN 100 VPD

LESS THAN 100 VPD

DESIGN SPEED: 55 MPH

FORCAST 2036

CLEAR ZONE DISTANCE: 12 FT

I HEREBY CERTIFY THAT THE ATTACHED PLANS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF NORTH DAKOTA.

APPROVED DATE

3/16/2016

DAVID L. WOOD /S/ APEX ENGINEERING GROUP DAVID L. WOOD registration number PE-6537 on 3/16/2016 and the original document is stored at the Ward County Engineering Dept.

This document was

originally issued and

sealed by



SHEET NO. PROJECT NO. PCN NO. 21281 2 ND ROM-0300(129)

DESCRIPTION
TEMPORARY EROSION AND SEDIMENT BEST MANAGEMENT PRACTICES

COUNTY ROAD 24 - GRADE RAISE TABLE OF CONTENTS

0003(14)

LIST OF STANDARD DRAWINGS (NDDOT)

STANDARD NO.	DESCRIPTION
D101-01,02,03	NDDOT ABBREVIATIONS
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D-203-08	STANDARD RURAL APPROACHES
D-255-02	EROSION AND SILTATION CONTROL EROSION CONTROL BLANKET INSTALLATION
D-260-01	EROSION AND SILTATION CONTROLS - SILT FENCE
D-260-01	EROSION CONTROL FIBER ROLL PLACEMENT DETAILS
D-704-05	CONSTRUCTION SIGN DETAIL
D-704-07	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS - PERFORATED TUBE
D-704-08	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS - U-CHANNEL POST
D-704-09	CONSTRUCTION SIGN DETAILS - TERMINAL AND GUIDE SIGNS
D-704-10	CONSTRUCTION SIGN DETAILS - REGULATORY SIGNS
D-704-11	CONSTRUCTION SIGN DETAILS - WARNING SIGNS
D-704-13	BARRICADE AND CHANNELIZING DEVICE DETAILS
D-704-14	CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS
D-704-15	ROAD CLOSURE LAYOUTS
D-704-20	TERMINAL AND SEAL COAT SIGN LAYOUTS
D-704-22	CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS
D-704-26	MISCELLANEOUS SIGN LAYOUTS
D-704-50	PORTABLE SIGN SUPPORT ASSEMBLY
D-708-06	EROSION AND SILTATION CONTROLS MEDIAN OR DITCH INLET PROTECTION
D-714-01	REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS (ROUND PIPE)
D-714-22	CONCRETE PIPE OR PRECAST CONCRETE BOX CULVERT TIES
D-714-25	TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL - PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE
D-714-27	PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE OR PIPE NOT UNDER THE ROADWAY
D-754-83	OBJECT MARKERS - CULVERTS

Apexá
Engineering Group

 STATE
 PROJECT NO.
 PCN NO.
 SECTION NO.
 SHEET NO.

 ND
 ROM-0300(129)
 21281
 2
 2

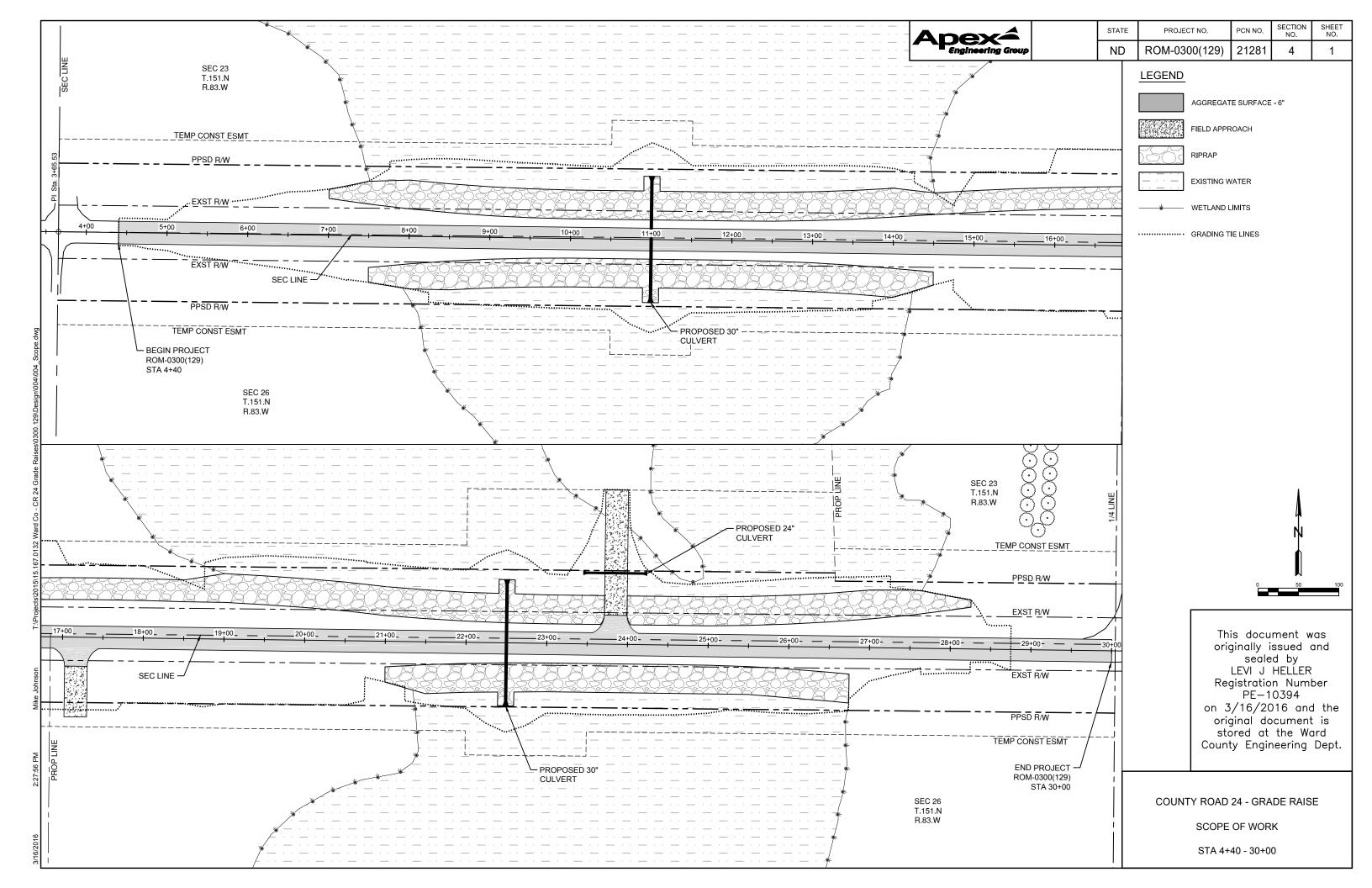
COUNTY ROAD 24 - GRADE RAISE

STANDARD DRAWINGS

cts/2015\15.167.0132 Ward Co - CR 24 Grade Raises\0300.129\Design\002\002 TBI

ce Johnson

16/2016



203-P06

GENERAL NOTES

104-P02



PROJECT NO. ROM-0300(129) 21281 6 ND

If the Contractor elects to incorporate the removed berm embankment within other areas on the project, the Contractor will not be paid for this material a second time. The Contractor will only be paid for borrow material removed from the borrow site.

All removed embankment not incorporated into the project shall become property of the Contractor and shall be disposed of outside the highway right of way in accordance with Section 107.17 of the Standard Specifications.

If the Contractor elects to dispose of the removed berm embankment at the borrow site, the Contractor shall work with the Engineer allowing the Engineer to cross-section the borrow site prior to the placing the waste embankment at the borrow site.

All costs of material, dewatering, construction, removal, and disposal of the berm shall be included in the price bid for "Borrow-Excavation". The quantity of borrow needed to construct the keyway and berm is included in the quantities for "Borrow-Excavation."

203-P07 WETLAND EXCAVATION: The excavation for wetland mitigation shall be paid for under the bid item "Common Excavation-Type A".

230-P01

256-P01

SUBGRADE PREPARATION-TYPE A: "SUBGRADE PREPARATION-TYPE A" has been provided for the entire length of the project. Subgrade preparation will be measured by the Station (STA).

The depth of subgrade preparation will be 12 inches and will be completed in accordance with Section 230.04 D 1 of the Standard Specifications. This item may be eliminated in areas if the Engineer determines that the subgrade is stable.

RIPRAP GRADE II: There is existing riprap in place throughout the project limits. The Contractor may salvage this existing riprap and place it at locations designated in the plans for new riprap. If the Contractor elects to salvage the riprap, the salvaged riprap shall be clean and free of debris and the rocks shall meet the gradation requirements in Section 256.03 C.1 of the Standard Specifications. Any riprap removed and not salvaged shall become the property of the Contractor and disposed of off the right of way in accordance with Section 107.17 of the Standard Specifications. Any riprap salvaged and placed shall be paid for as "Riprap Grade II."

Riprap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing or damaging the riprap fabric. The large stones shall be well distributed and the entire mass of stones in their final position shall be graded to conform to a uniform appearance as agreed upon by the Engineer and Contractor. Placing riprap in layers will not be permitted. Placing riprap by dumping it at the top of the slope and pushing it down the slope shall not be permitted. Hand placing of riprap will be required to close up voids within the rock mass. All costs to complete the above described work shall be included in the price bid for "Riprap Grade II".

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COUNTY ROAD 24 - GRADE RAISE NOTES

the time of construction.

HAUL ROADS: Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes."

WATER LEVEL: The Contractor should be aware that the water levels on this

project may fluctuate. The Contractor's unit bid prices for all bid items will be

considered full compensation for that item regardless of the water elevation at

It is the responsibility of the Contractor to become informed in regards to the

REMOVAL OF PIPE ALL TYPES AND SIZES: All existing pipes to be removed shall become the property of the Contractor and shall be disposed of in accordance with Section 107.17 of the standard specifications.

SHRINKAGE/MATERIAL LOSS: 50 percent additional volume is included for shrinkage in earth embankment and loss of embankment material placed below the water elevation and 20 percent additional volume above the water.

AVERAGE HAUL: No average haul has been computed for this project.

COMMON EXCAVATION-TYPE A: Payment for "Common Excavation-Type A" shall be at contract plan quantity.

> TOPSOIL: Remove topsoil from all excavation and embankment areas that are above the current water level. Spread topsoil evenly in areas to be seeded and mulched as shown in Section 77 of the plans.

TOPSOIL-WETLAND: Remove topsoil from impacted wetland areas that are above the current water level. Spread topsoil-wtland evenly in areas to receive wetland seed as shown in Section 77 of the plans.

BORROW-EXCAVATION: The borrow required for constructing the grade

raise will not be obtained from within the highway right of way. It will be the Contractor's responsibility to obtain borrow areas. All clearances and permits necessary to obtain the borrow material are the contractor's responsibility.

KEYWAY AND BERM: A keyway and berm shall be constructed in areas where the inslope and proposed riprap extends into the water at locations as shown on the plans. The keyway/berm shall be constructed as shown in the typical sections of the plans.

The berm shall be removed in its entirety at pipe locations after the new pipes have been installed. In addition, the keyway/berm shall be removed to one foot below the existing water elevation after the riprap is placed. The Contractor is required to remove this described embankment and will not be allowed to push the embankment into the water so it is below the water elevation. The Contractor may incorporate the removed embankment into other areas of the project.

PROJECT NO. PCN NO. ROM-0300(129) 21281 6 2 ND

SILT FENCE SUPPORTED: Do not embed silt fence in areas of 261-P01

standing water.

262-P01 FLOTATION SILT CURTAIN: The flotation silt curtain shall be installed on the water before any existing riprap can be designated for salvage and before any fill for road embankment can be placed or topsoil stripped.

> The Contractor shall place the floating silt curtain at a distance from the edge of the water that allows sufficient area to construct the project without placing material against the flotation silt curtain.

> Sufficient quantity of "Flotation Silt Curtain" has been provided to allow for installation of curtain along both sides of the roadway within the closed water basin as shown in the plans, without requiring curtain to be moved from one location to the next. If the contractor chooses to install more Flotation Silt Curtain then plan quantity, the amount greater than plan quantity will not be paid for.

302-P01 TRAFFIC SERVICE AGGREGATE: The Contractor shall provide Temporary Traffic Service Aggregate to be used to maintain traffic. A quantity of 1,000 TON has been provided.

> TRAFFIC CONTROL DURING WORKING AND NON WORKING HOURS: The Contractor shall maintain one lane of traffic at all times during working hours. During non-working hours, the Contractor shall leave the work area free of all hazards. A minimum 24-foot roadway width will be required to maintain two lanes of traffic. The traffic control plan requires flagging and pilot car during working hours. The traffic control devices for flagging shall be removed at the end of each day and reinstalled when work commences. If a hazard exists after hours, the Contractor shall leave the required traffic control devices in place and provide flag persons at his own expense until the hazard has been eliminated. Hazards include but are not limited to inslopes steeper than 4:1 within the clear zone and vertical drop offs.

> TRAFFIC CONTROL FOR CENTERLINE PIPE INSTALLATIONS: The Contractor shall keep the road open to traffic by staging the construction and creating temporary bypasses, if necessary, around the excavation area. The Contractor shall submit a staging, traffic control plan and schedule to the Engineer for review and approval at least three days prior to the pre-construction conference. All costs for the staging, and traffic control for the centerline pipe installation shall be included in the price bid for "Pipe Conc Reinf IN CL III".

PIPE CONDUIT: All RCP sections, including end sections, shall be installed with tied joints. See standard drawing D-714-22 for fastener and tie bolt details. All joints shall be wrapped with Geosynthetic Material Type S2, 2 foot minimum width. The cost of providing and installing tie bolts, fasteners, and fabric shall be included in the price bid for "Pipe Conc Reinf __IN CL III".

714-P02 COFFERDAM: Cofferdams may be required to construct the centerline and approach culverts. Cofferdams shall be constructed from earthen material. Upon completion of the culvert installation, the earthen material that was used for the cofferdam shall be removed and shall be

considered waste material. Waste material may be used on approach inslopes if approved by the Engineer or hauled to an approved site in accordance with Section 107.17 of the Standard Specifications.

The contractor shall be responsible for obtaining any permits required if constructing the cofferdams causes impacts beyond the impact areas shown in Section 75 of the plans. All costs associated with completing the above described work including dewatering shall be included in the price bid for "Pipe Conc Reinf_IN CL III".

EXISTING SIGNS: All existing signs and posts designated for removal in Section 110 of the plans shall be removed and delivered to the Ward County Highway Department. Signs and posts shall be delivered in the same condition prior to the start start of construction. Any damage to the sign or posts shall be replaced at the contractors expense. The Contractor shall provide 48 hours notice to the Ward County office prior to delivery of the signs and posts.

900 13th St SE Minot, ND 58701 Phone: 701-838-2810

754-P01

The cost of removal and delivery of the signs and posts shall not be paid for separately, but shall be included in the price bid for other items.

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COUNTY ROAD 24 - GRADE RAISE

NOTES

704-P01

704-P02

714-P01

QUANTITIES

SPEC CODE DESCRIPTION					
201 0330 CLEARING & GRUBBING L SUM 1 202 0174 REMOVAL OF PIPE ALL TYPES AND SIZES LF 54 202 0312 REMOVE EXISTING FENCE LF 1,527 203 0101 COMMON EXCAVATION-TYPE A CY 11,569 203 0109 TOPSOIL CY 2,100 203 0119 TOPSOIL-IMPORTED CY 500 203 0121 TOPSOIL-WETLAND CY 471 203 0140 BORROW-EXCAVATION CY 69,240 216 0100 WATER M GAL 904 230 0165 SUBGRADE PREPARATION-TYPE A-12IN STA 24.4 251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 6.21 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 1010 TRAW MULCH ACRE 11.28 255 0103 ECB TYPE	SPEC	CODE	DESCRIPTION	UNIT	QUANITITY
202 0174 REMOVAL OF PIPE ALL TYPES AND SIZES LF 54 202 0312 REMOVE EXISTING FENCE LF 1,527 203 0101 COMMON EXCAVATION-TYPE A CY 11,569 203 0109 TOPSOIL CY 2,100 203 0119 TOPSOIL-IMPORTED CY 500 203 0121 TOPSOIL-WETLAND CY 471 203 0140 BORROW-EXCAVATION CY 69,240 216 0100 WATER M GAL 904 230 0165 SUBGRADE PREPARATION-TYPE A-12IN STA 24.4 251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 6.21 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 0101 STRAW MULCH ACRE 6.21 255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II </td <td>103</td> <td>0100</td> <td>CONTRACT BOND</td> <td>L SUM</td> <td>1</td>	103	0100	CONTRACT BOND	L SUM	1
202 0312 REMOVE EXISTING FENCE LF 1,527 203 0101 COMMON EXCAVATION-TYPE A CY 11,569 203 0109 TOPSOIL CY 2,100 203 0119 TOPSOIL-IMPORTED CY 500 203 0121 TOPSOIL-WETLAND CY 471 203 0140 BORROW-EXCAVATION CY 69,240 216 0100 WATER M GAL 904 230 0165 SUBGRADE PREPARATION-TYPE A-12IN STA 24.4 251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 6.21 251 1000 WETLAND SEED ACRE 6.21 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 0101 STRAW MULCH ACRE 11.28 255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II CY	201	0330	CLEARING & GRUBBING	L SUM	1
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203 0121 TOPSOIL-WETLAND CY 471 203 0140 BORROW-EXCAVATION CY 69,240 216 0100 WATER M GAL 904 230 0165 SUBGRADE PREPARATION-TYPE A-12IN STA 24.4 251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 0.24 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 0101 STRAW MULCH ACRE 11.28 255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II CY 6,513 260 0200 SILT FENCE SUPPORTED LF 424 261 0112 FIBER ROLLS 12IN LF 4,880 261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 262 0101 REMOVE FLOTATION SILT	203	0109	TOPSOIL	CY	2,100
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216 0100 WATER M GAL 904 230 0165 SUBGRADE PREPARATION-TYPE A-12IN STA 24.4 251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 0.24 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 0101 STRAW MULCH ACRE 11.28 255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II CY 6,513 260 0200 SILT FENCE SUPPORTED LF 424 260 0201 REMOVE SILT FENCE SUPPORTED LF 4,880 261 0112 FIBER ROLLS 12IN LF 4,880 261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	203	0121	TOPSOIL-WETLAND	CY	471
230 0165 SUBGRADE PREPARATION-TYPE A-12IN STA 24.4 251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 0.24 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 0101 STRAW MULCH ACRE 11.28 255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II CY 6,513 260 0200 SILT FENCE SUPPORTED LF 424 260 0201 REMOVE SILT FENCE SUPPORTED LF 4,880 261 0112 FIBER ROLLS 12IN LF 4,880 261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 262 0101 REMOVE FLOTATION SILT CURTAIN LF 3,165 302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	203	0140	BORROW-EXCAVATION	CY	69,240
251 0200 SEEDING CLASS II ACRE 6.21 251 1000 WETLAND SEED ACRE 0.24 251 2000 TEMPORARY COVER CROP ACRE 6.21 253 0101 STRAW MULCH ACRE 11.28 255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II CY 6,513 260 0200 SILT FENCE SUPPORTED LF 424 260 0201 REMOVE SILT FENCE SUPPORTED LF 424 261 0112 FIBER ROLLS 12IN LF 4,880 261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 262 0101 REMOVE FLOTATION SILT CURTAIN LF 3,165 302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	216	0100	WATER	M GAL	904
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255 0103 ECB TYPE 3 SY 5,476 256 0200 RIPRAP GRADE II CY 6,513 260 0200 SILT FENCE SUPPORTED LF 424 260 0201 REMOVE SILT FENCE SUPPORTED LF 424 261 0112 FIBER ROLLS 12IN LF 4,880 261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 262 0101 REMOVE FLOTATION SILT CURTAIN LF 3,165 302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	251	2000	TEMPORARY COVER CROP	ACRE	6.21
256 0200 RIPRAP GRADE II CY 6,513 260 0200 SILT FENCE SUPPORTED LF 424 260 0201 REMOVE SILT FENCE SUPPORTED LF 424 261 0112 FIBER ROLLS 12IN LF 4,880 261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 262 0101 REMOVE FLOTATION SILT CURTAIN LF 3,165 302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	253	0101	STRAW MULCH	ACRE	11.28
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261 0113 REMOVE FIBER ROLLS 12IN LF 3,410 262 0100 FLOTATION SILT CURTAIN LF 3,165 262 0101 REMOVE FLOTATION SILT CURTAIN LF 3,165 302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	260	0201	REMOVE SILT FENCE SUPPORTED	LF	424
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302 0050 TRAFFIC SERVICE AGGREGATE TON 1,000	262	0100	FLOTATION SILT CURTAIN	LF	3,165
	262	0101	REMOVE FLOTATION SILT CURTAIN	LF	3,165
302 0120 AGGREGATE BASE COURSE CL 5 TON 2.770	302	0050	TRAFFIC SERVICE AGGREGATE	TON	1,000
2,770	302	0120	AGGREGATE BASE COURSE CL 5	TON	2,770
702 0100 MOBILIZATION L SUM 1	702	0100	MOBILIZATION	L SUM	1
704 0100 FLAGGING MHR 1,700	704	0100	FLAGGING	MHR	1,700
704 1000 TRAFFIC CONTROL SIGNS UNIT 916	704	1000	TRAFFIC CONTROL SIGNS	UNIT	916
704 1052 TYPE III BARRICADE EA 2	704	1052	TYPE III BARRICADE	EA	2
704 1067 TUBULAR MARKERS EA 60	704	1067	TUBULAR MARKERS	EA	60
704 1080 STACKABLE VERTICAL PANELS EA 120	704	1080	STACKABLE VERTICAL PANELS	EA	120
704 1185 PILOT CAR HR 700			PILOT CAR	HR	700
709 0151 GEOSYNTHETIC MATERIAL TYPE R1 SY 1,220					
709 0155 GEOSYNTHETIC MATERIAL TYPE RR SY 16,352	709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	16,352
714 0615 PIPE CONC REINF 24IN CL III LF 66	714		PIPE CONC REINF 24IN CL III		
714 0820 PIPE CONC REINF 30IN CL III LF 288	-		PIPE CONC REINF 30IN CL III	LF	<u> </u>
714 3020 END SECT-CONC REINF 24IN EA 2	714		END SECT-CONC REINF 24IN	EA	2
714 3030 END SECT-CONC REINF 30IN EA 4	714		END SECT-CONC REINF 30IN	EA	4
754 0805 OBJECT MARKERS - CULVERTS EA 6	754	0805	OBJECT MARKERS - CULVERTS	EA	6



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Dave Wood

3-07-37 DM

COUNTY ROAD 24 - GRADE RAISE

QUANTITIES

	754 - 0805 OB	JECT MARKERS - CULVERTS	
STATION	OFFSET	STRUCTURE	QUANTITY (EA)
11+00	LT	FLARED END SECTION	1
11+00	RT	FLARED END SECTION	1
22+50	RT	FLARED END SECTION	1
22+50	LT	FLARED END SECTION	1
23+48	LT	FLARED END SECTION	1
21+19	LT	FLARED END SECTION	1
		TOTAL:	6

230	230-0165 SUBGRADE PREPARATION - TYPE A - 12IN										
BEGIN STATION	END STATION	QUANTITY (STA)									
4+40	28+75	24.4									

MATERIAL UNIT WEIGHTS

EXISTING AGGREGATE BASE @ 1.875 TON/CY AGGREGATE BASE COURSE @ 1.875 TON/CY TRAFFIC SERVICE AGGREGATE @ 1.875 TON/CY

TOPSOIL

TOPSOIL REMOVAL AND PLACEMENT IS BASED ON 4" DEPTH

TOPSOIL - WETLAND

TOPSOIL - WETLAND IS BASED ON A 6" REMOVAL DEPTH AND 12" PLACEMENT DEPTH.

WATER

10 GAL/CY OF EMBANKMENT MATERIAL 40 GAL/TON OF SALVAGED BASE COURSE 1.5 GAL/SY FOR SUBGRADE PREPERATION 25 MGAL/MILE FOR DUST PALLIATIVE

EARTHWORK SUMMARY



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LOCATION CR 24 Sta 4+40.00 - 30+00.00 TOTALS	COMMON EXCAVATION - TYPE A (CY) PAY ITEM	EMBANKMENT (CY)	BORROW EXCAVATION (CY) PAY ITEM	
	Α	В	C = B - A	
CR 24				
Sta 4+40.00 - 30+00.00	11,569	80,809	69,240	
TOTALS	11,569	80,809	69,240	

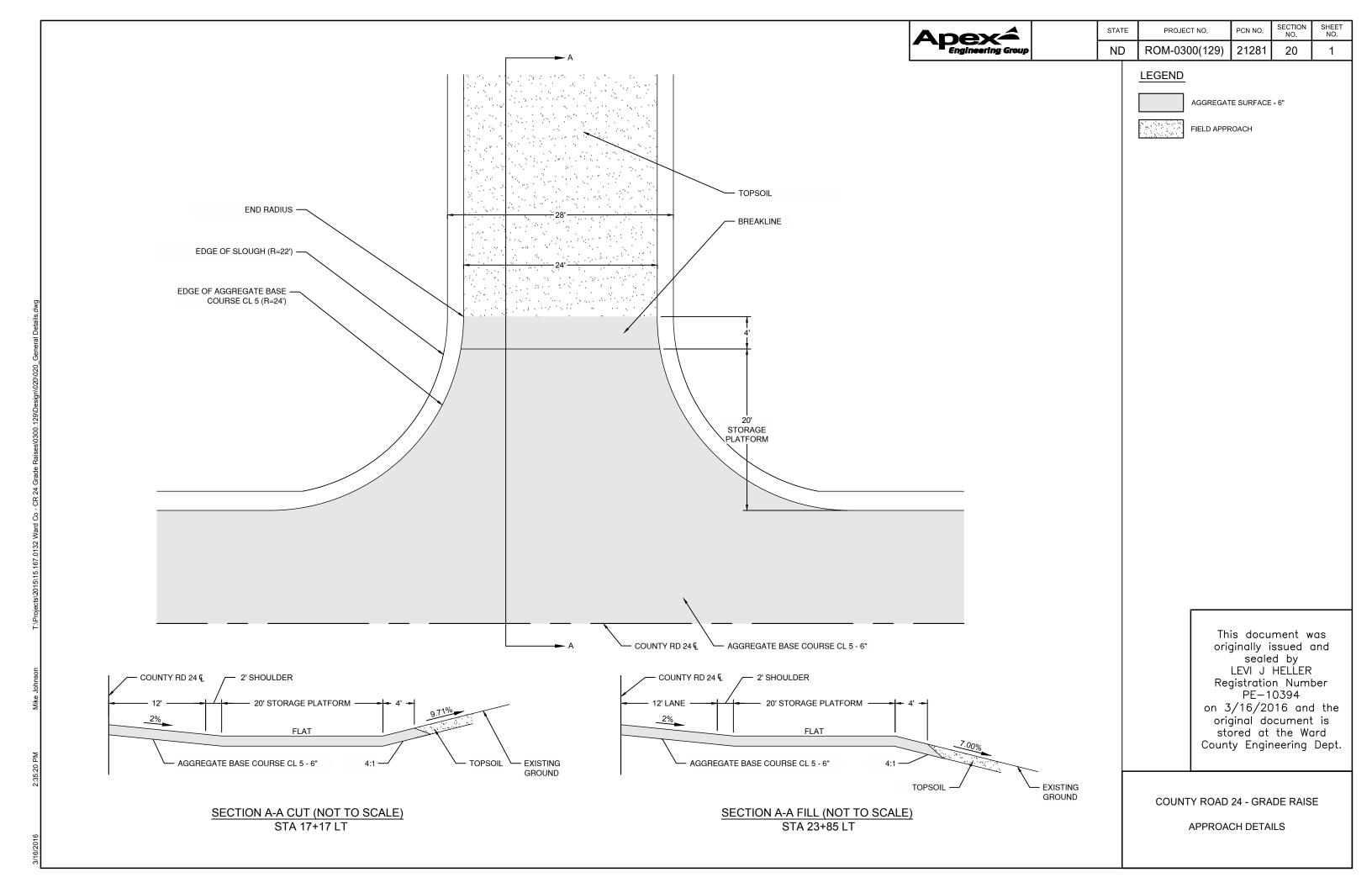
NOTES:

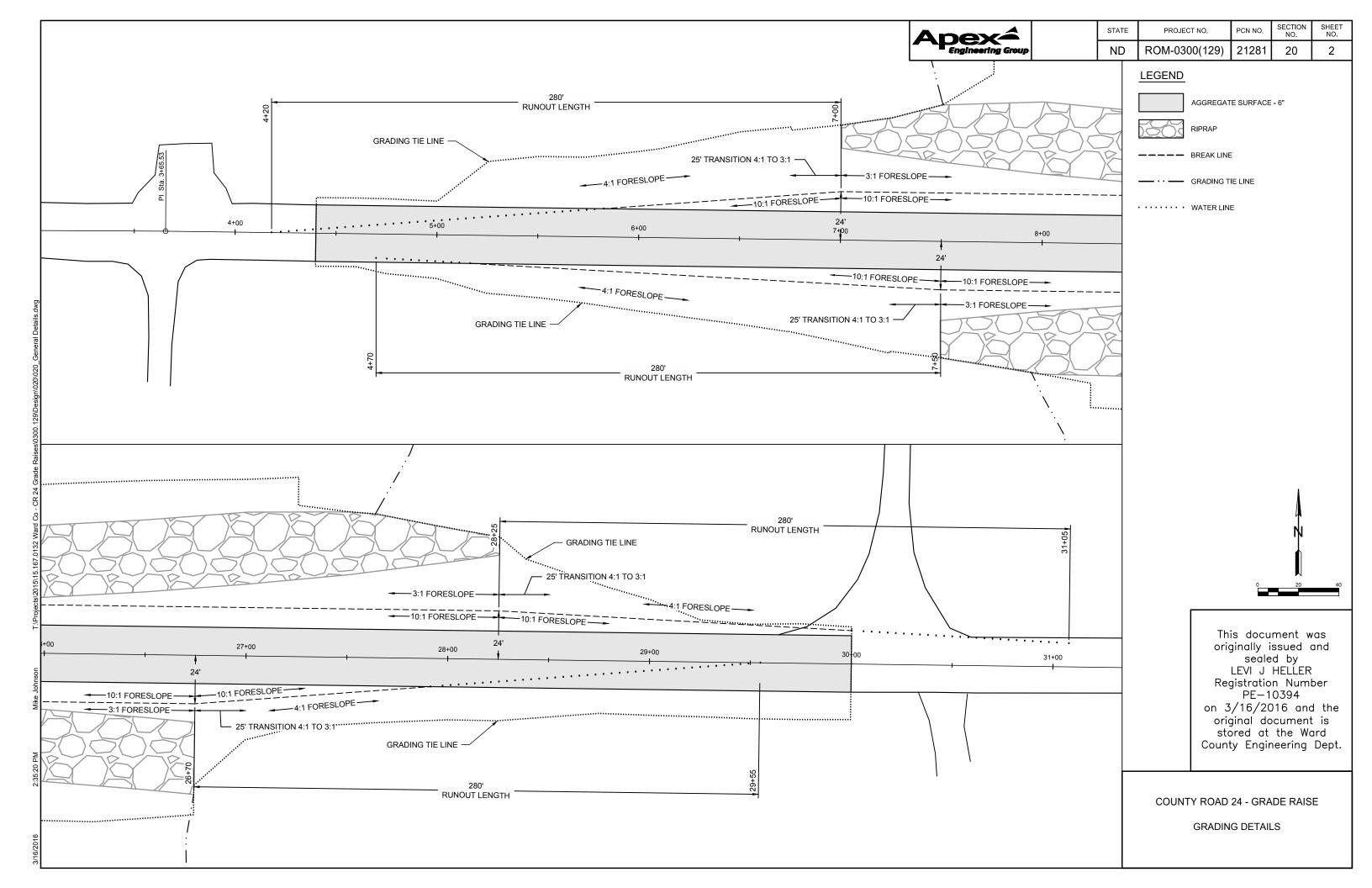
- 1. THIS COMPUTATION REPORT IS NOT A BALANCE SHEET. THE CONTRACTOR SHALL CALCULATE ITS OWN BALANCE OF MATERIALS.
- 2. AN ADDITIONAL VOLUME OF 20% TO ALLOW FOR SHRINKAGE IS INCLUDED IN ALL EMBANKMENT VOLUMES NOT FILLED IN WATER.
- 3. AN ADDITIONAL VOLUME OF 50% TO ALLOW FOR MATERIAL LOSS IS INCLUDED IN ALL EMBANKMENT VOLUMES FILLED IN WATER.

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COUNTY ROAD 24 - GRADE RAISE

BASIS OF ESTIMATE







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 SECTION NO.
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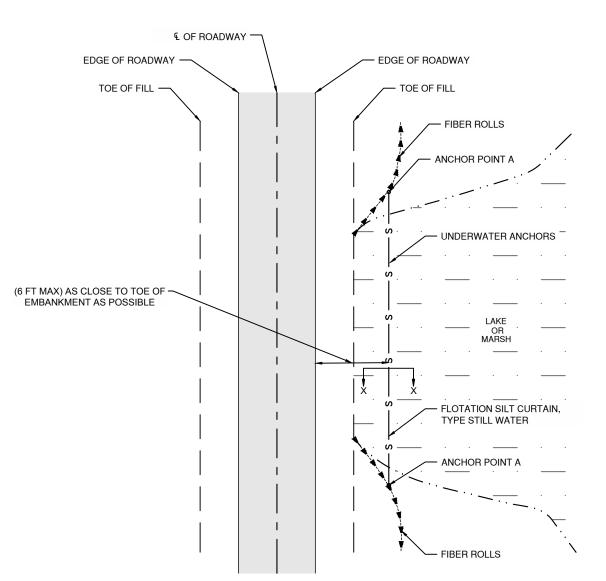
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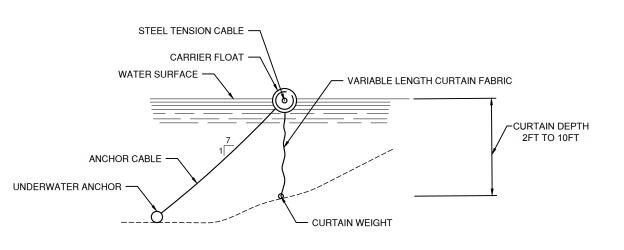
LEGEND

-·· — WATER LINE

—— S —— FLOTATION SILT CURTAIN

---- GROUND LINE





SECTION X-X FLOTATION SILT CURTAINS

NOTE:

MAXIMUM WATER VELOCITY FOR MOVING WATER = 5 FT/SEC

This document was originally issued and sealed by LEVI J HELLER Registration Number PE-10394 on 3/16/2016 and the original document is stored at the Ward County Engineering Dept.

COUNTY ROAD 24 - GRADE RAISE
FLOTATION SILT CURTAIN DETAILS

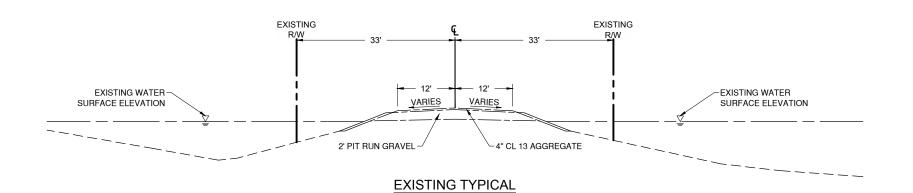
<u>PLAN VIEW</u>

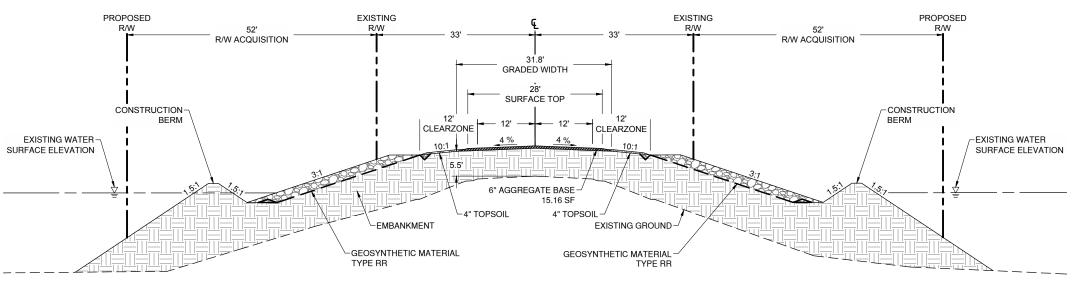
FLOTATION SILT CURTAIN - TYPE STILL WATER
THE SILT CURTAIN SHALL EXTEND ONTO SHORE
AND SHALL ALSO BE ANCHORED THERE.



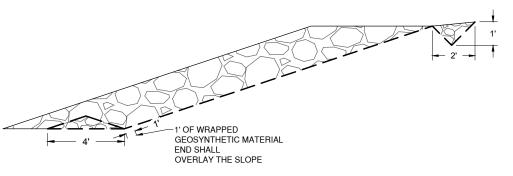
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PROPOSED TYPICAL 5.5' GRADE RAISE



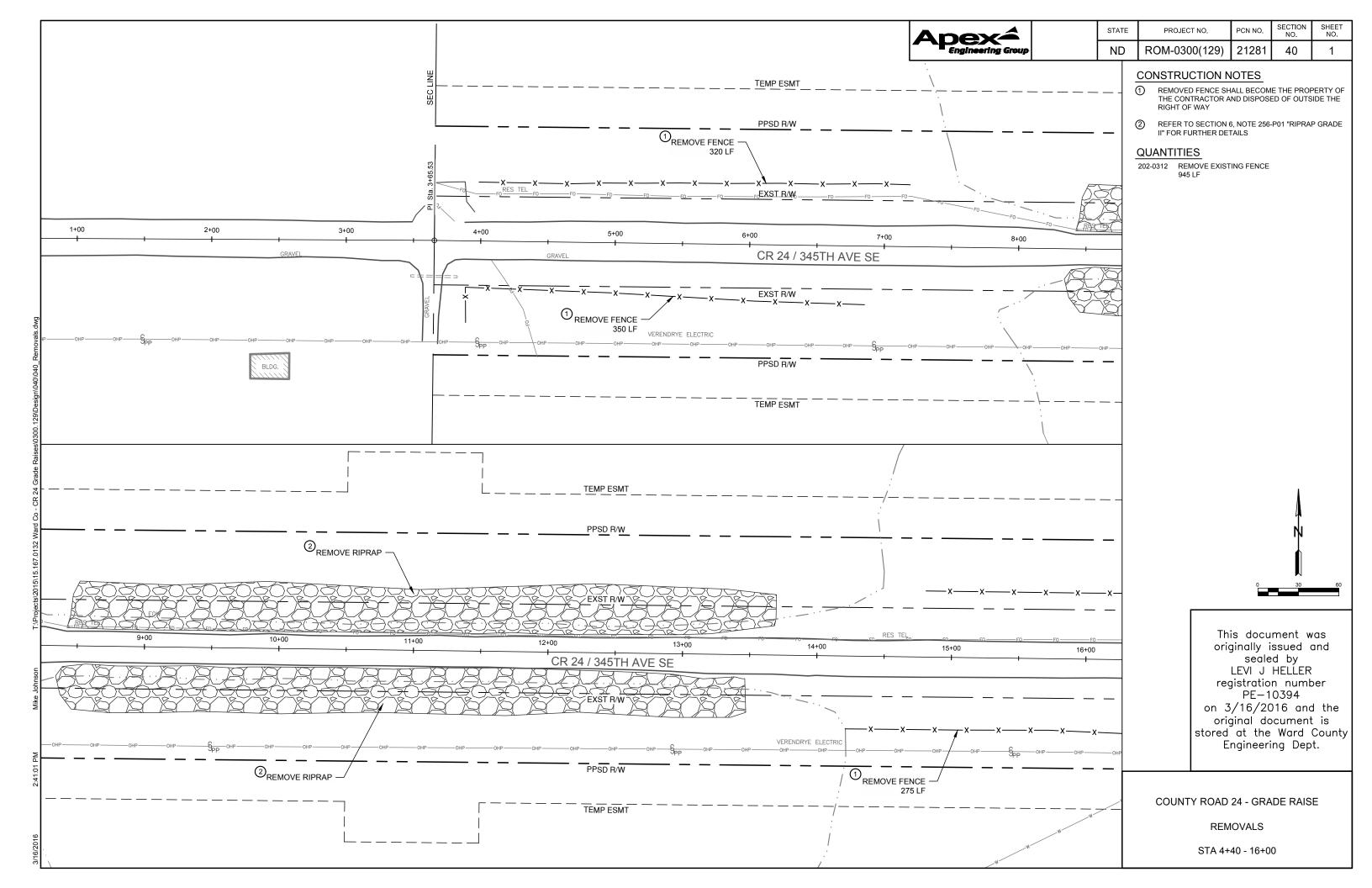
DUTCH WRAP DETAIL

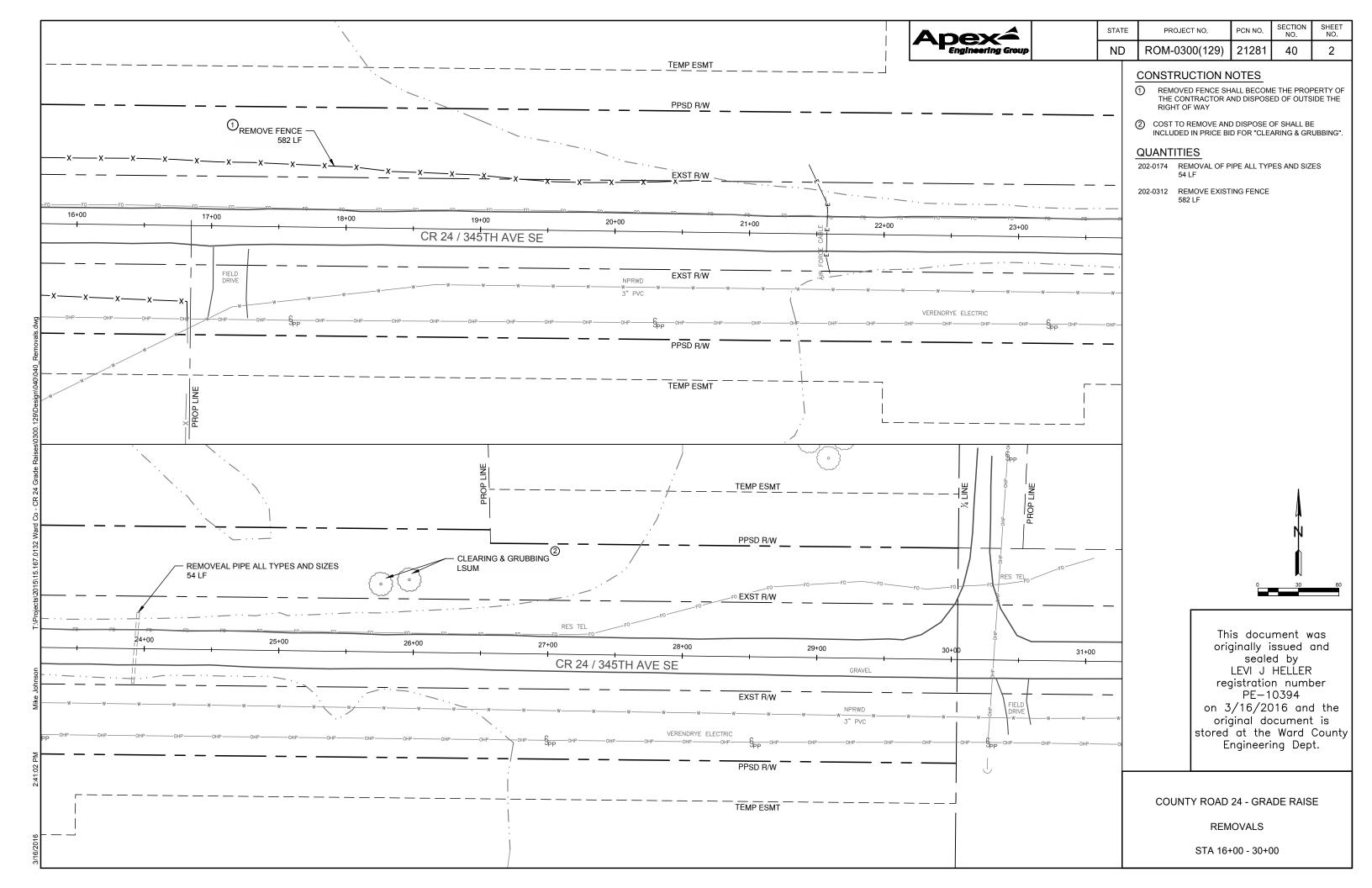
This document was originally issued and sealed by
LEVI J HELLER registration number
PE-10394
on 3/16/2016 and the original document is stored at the Ward County Engineering Dept.

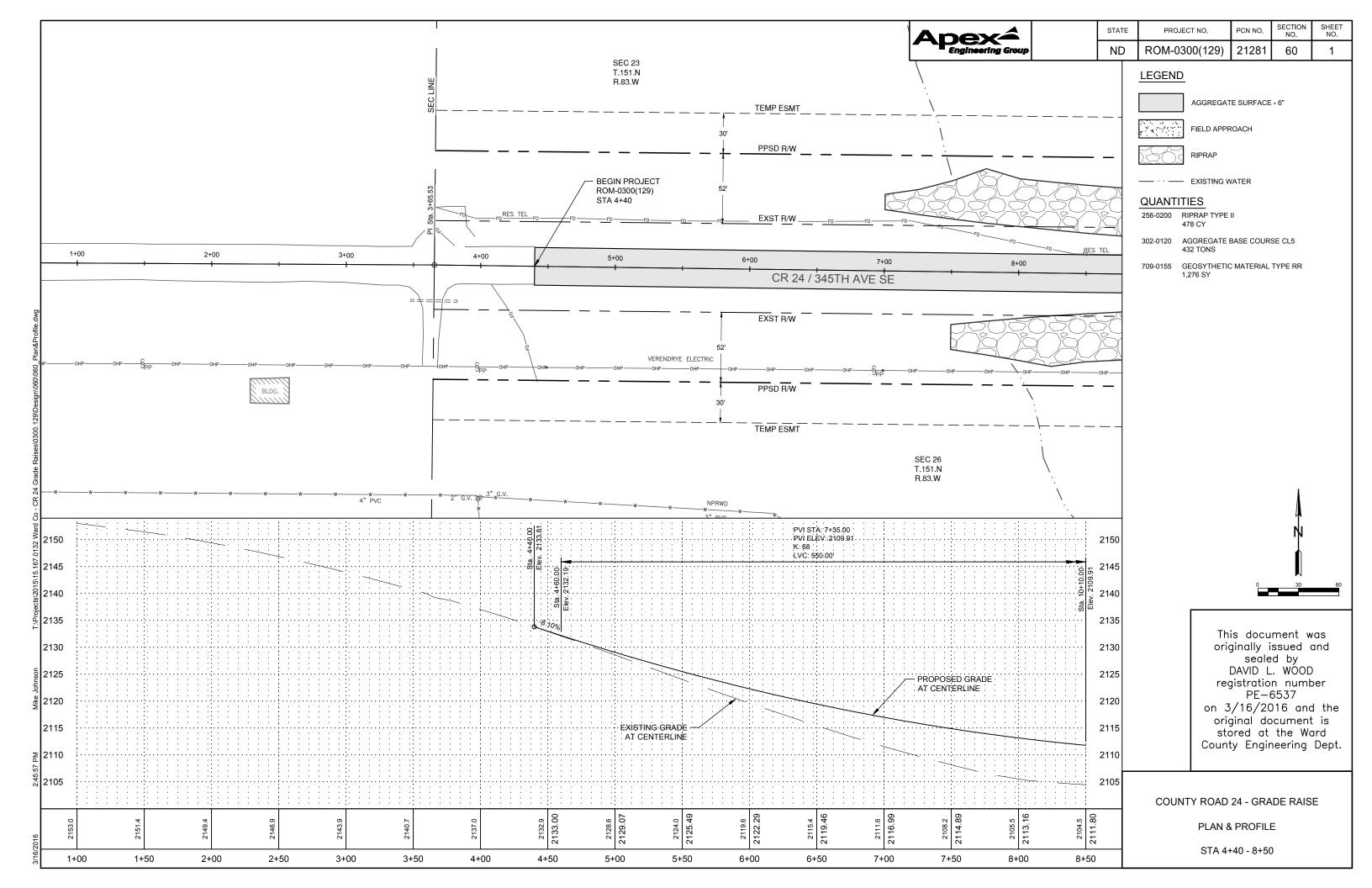
COUNTY ROAD 24 - GRADE RAISE

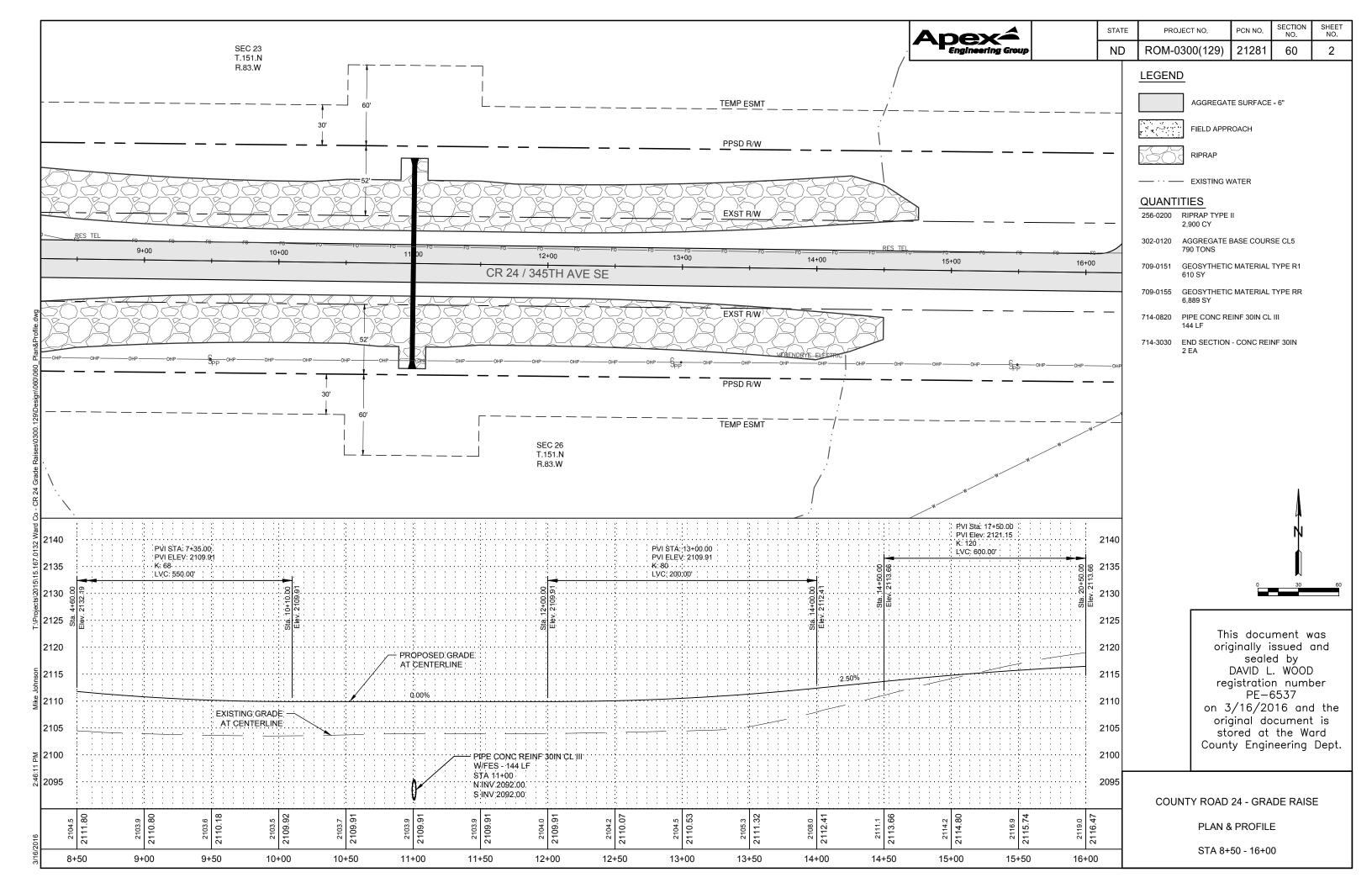
TYPICAL SECTIONS

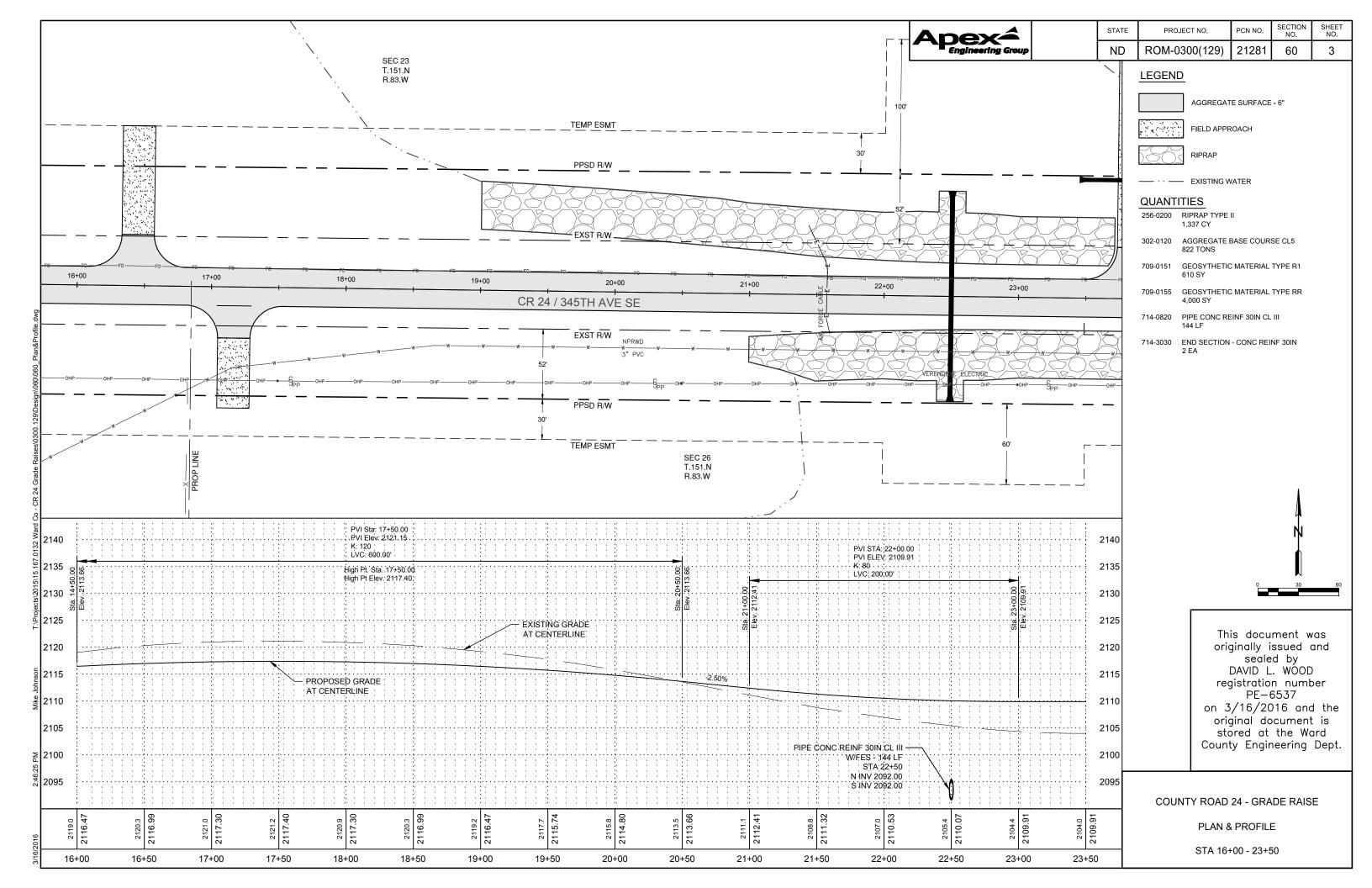
STA 4+40 - 30+00

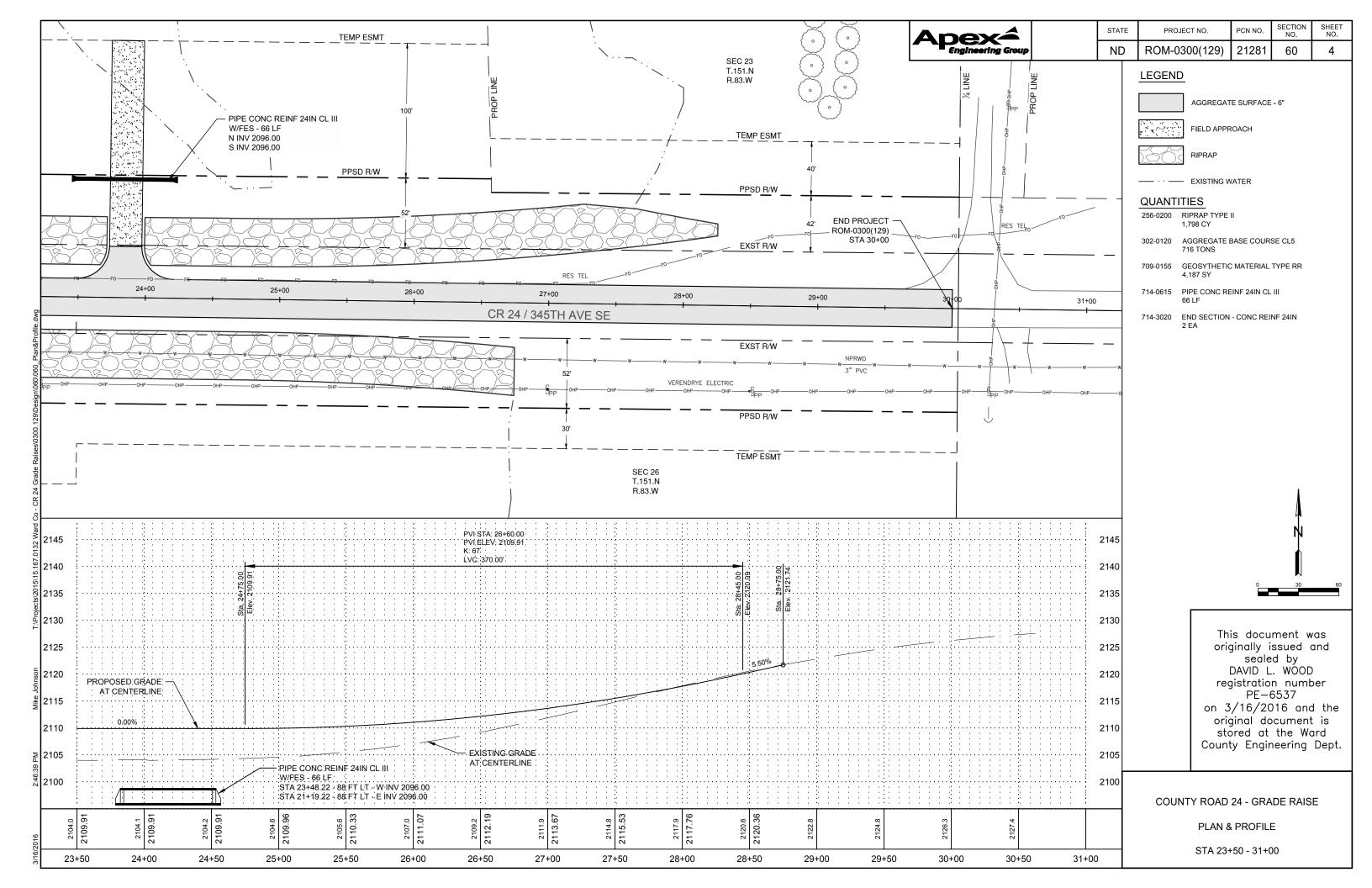


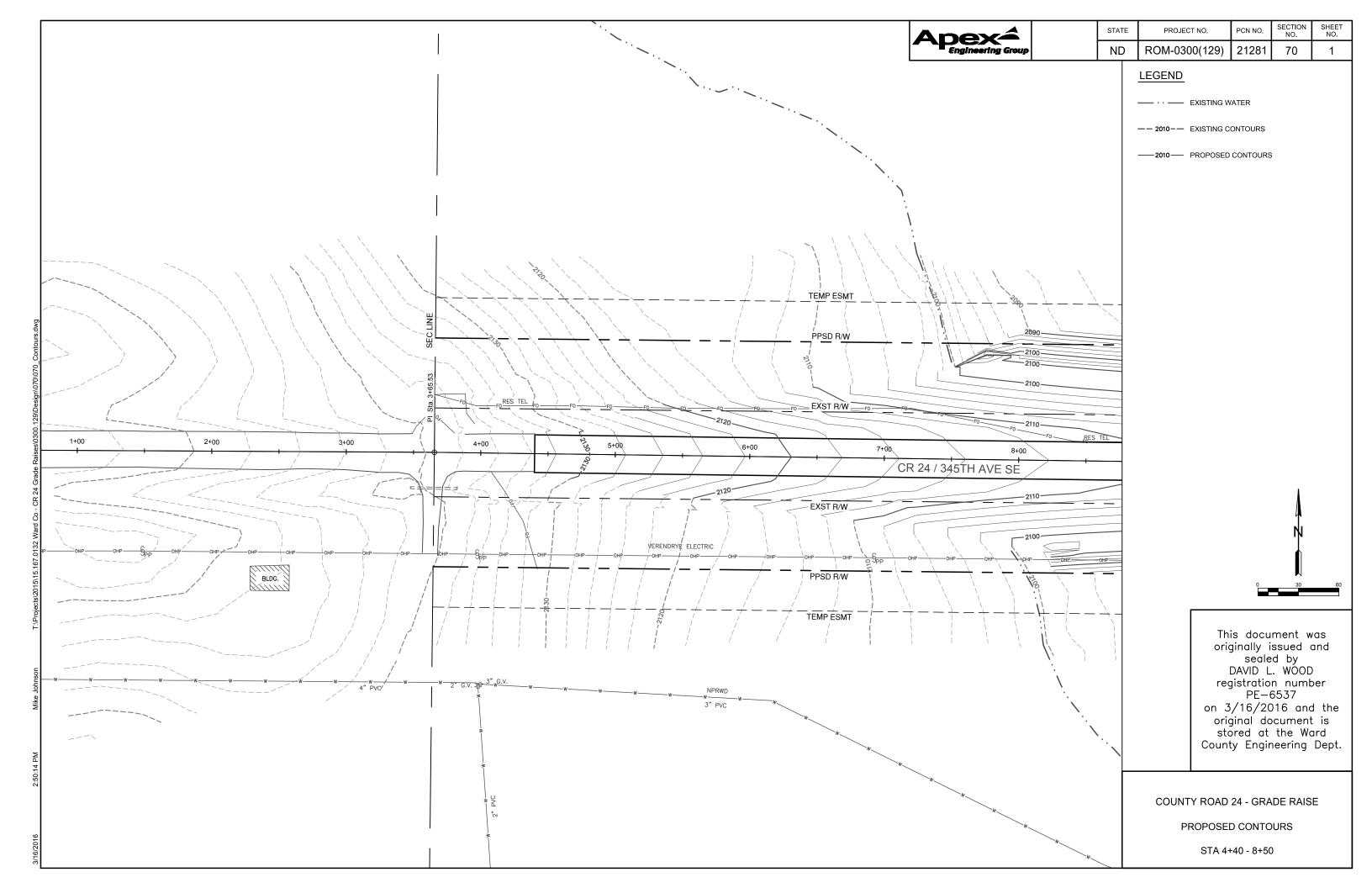


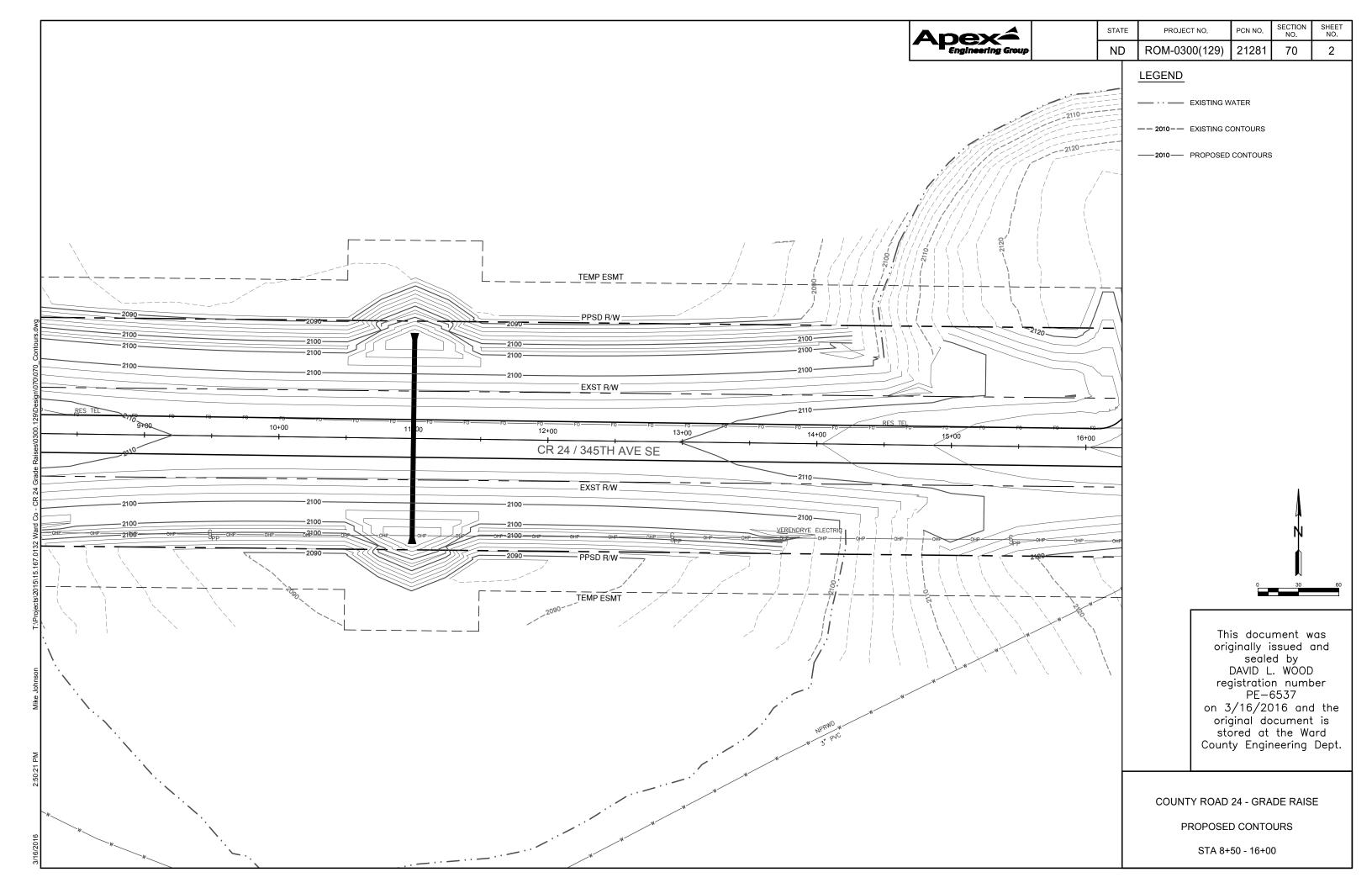


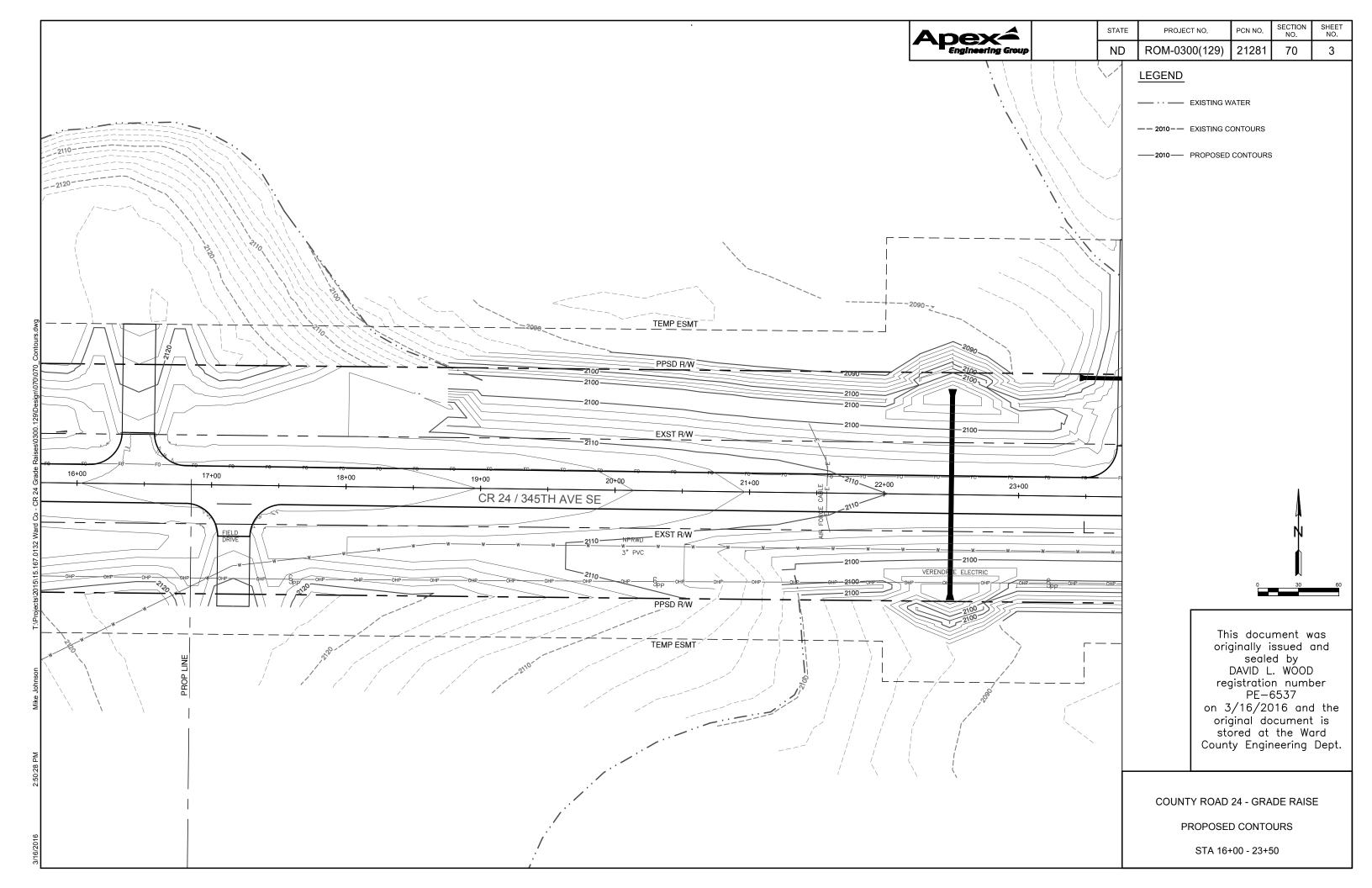


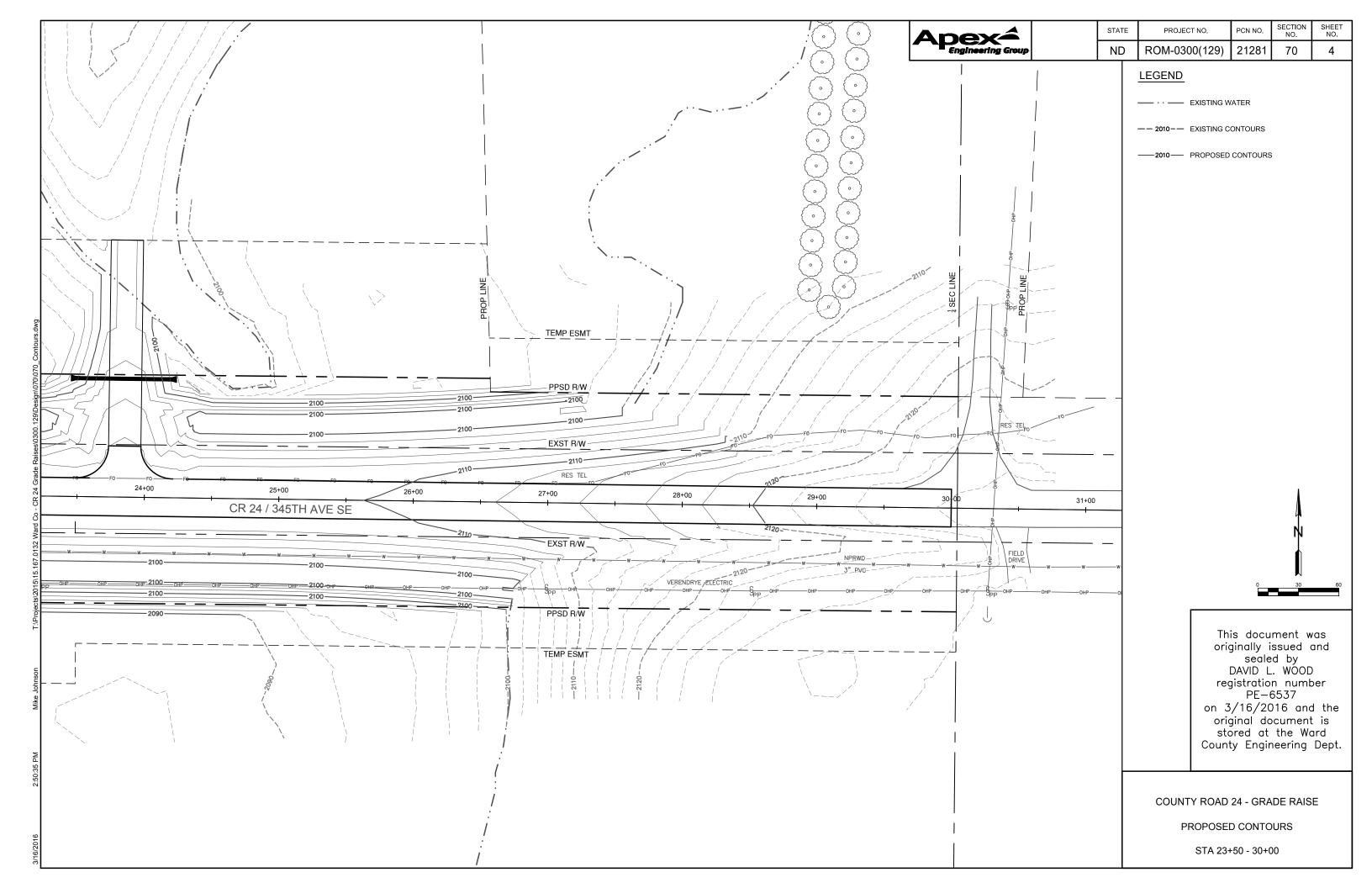














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ENVIRONMENTAL COMMITMENTS (EC): Ward County, the North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable permanent wetland impacts will be mitigated at a NDDOT approved mitigation site or bank in accordance with the mitigation guidance ^{2, 3}.

ACTION REQUIRED / TAKEN: 0.37 acres of permanent wetland impacts will require mitigation. Ward County proposes to mitigate by compensation: 0.37 acres at Ducks Unlimited In-Lieu Fee mitigation bank within the Missouri North Watershed for USACE jurisdictional impacts. 0.24 acres of wetlands will be impacted temporarily. Temporary impact areas will be graded to preconstruction contours.

EC-2: The project is located within the migration corridor of the endangered whooping crane, and suitable stopover habitat for the whooping crane is present. The migration periods of the whooping crane are April 1st to May 15th and September 1st to October 31st.

ACTION REQUIRED / TAKEN: The contractor will notify the Project Engineer immediately in the event a whooping crane is identified within one mile of the Project Area. The Project Engineer will cease all construction activities, establish an avoidance area, and immediately notify and coordinate with the USFWS, FHWA, and NDDOT. The contractor will not resume work within the avoidance area until the Project Engineer has confirmed that the bird has left the area. In addition, if above ground utility lines are adjusted/relocated or newly installed as a result of this project, line markers (bird diverters) will be added at a ratio of 1:1 (per linear foot) to the adjusted/relocated lines, and a 2:1 ratio to the newly installed lines. Refer to the Utility Conflict Plans regarding bird diverter information, and Relocation Utility Agreement.

	Wetland Impact Table																		
							Wetland Imp	pacts (acres)		Easement					etland Mitig	gation			
Wetland		Cowardin Class.		Wetland	Wetland	USACE	-		impacts	(acres)	Mit	igation Requi	ired	Bani	(Onsite	
Number	Location		Wetland Type	Size (acres)		Jurisdictional Wetlands ¹	Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	acres	Mitigation Location; Ratio	Acres	Constructed Site #	Constructed size (acres)
1a	Sec. 23, T151N, R83W	PEMC	Depression	0.04	Natural	Yes	0.01	0.02	NA	NA	N	Υ	N	Ducks Unlimited Mitigation Bank	0.02				
1b	Sec. 26, T151N, R83W	PEMC	Depression	0.17	Natural	Yes	0.03	0.06	NA	NA	N	Υ	N	Ducks Unlimited Mitigation Bank	0.06				
1c	Sec. 23, T151N, R83W	PEMC	Depression	0.46	Natural	Yes	0.18	0.18	NA	NA	N	Υ	N	Ducks Unlimited Mitigation Bank	0.18				
1d	Sec. 26, T151N, R83W	PEMC	Depression	0.22	Natural	Yes	0.02	0.11	NA	NA	N	Υ	N	Ducks Unlimited Mitigation Bank	0.11				
<u> </u>			Totals	0.89			0.24	0.37	0.00	0.00					0.37		0.00		0.00

NOTES

ENVIRONMENTAL COMMITMENTS

This document was originally issued and sealed by DAVID L. WOOD registration number PE-6537 on 3/16/2016 and the original document is stored at the Ward County Engineering Dept.

COUNTY ROAD 24 - GRADE RAISE ENVIRONMENTAL COMMITMENTS

¹ A wetland Jurisdictional Determination was issued by the USACE on 2/22/2016; NWO-2015-2382-BIS.

²All impacts to natural jurisdictional wetlands, regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.

All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), and temporary impacts do not require mitigation.



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	Other Waters Impact Table																
	Other Waters												Other Water Mitigation				
			Siz	:e		USACE			Impacts to 0	Other Waters			ı	Mitigation Require	d	Mitigation	
Number	Location	Туре	Acres	Linear Feet	Feature	Jurisdictional ¹	Ac Temp	res Perm	Linea Temp	r Feet Perm	Deep Temp	Water Perm	EO 11990	USACE	USFWS	Location; ratio	Method
OW 1a	Sec. 23, T151N, R83W	Deep Water	5.91	NA	Lake	Yes	0.72	0.72	NA	NA	0.79	1.24	N	N	N		
OW 1b	Sec. 26, T151N, R83W	Deep Water	2.32	NA	Basin	Yes	0.13	0.31	NA	NA	0.28	0.54	N	N	N		
OW 1c	Sec. 26, T151N, R83W	Deep Water	2.11	NA	Lake	Yes	0.15	0.42	NA	NA	0.22	0.30	N	N	N		
		Totals	10.34	0.00			1.00	1.45	0.00	0.00	1.29	2.08					

NOTES

³ All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), and temporary impacts do not require mitigation.

Summary Impact Table			
Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.37	Temporary JD	0.24
Natural/Non- JD	0.00	Non-JD Temporary	0.00
Artificial/JD	0.00	Permanent JD > 0.10	0.00
Artificial /Non- JD	0.00	Permanent OW	1.45
Total	0.37	Temporary OW	1.00

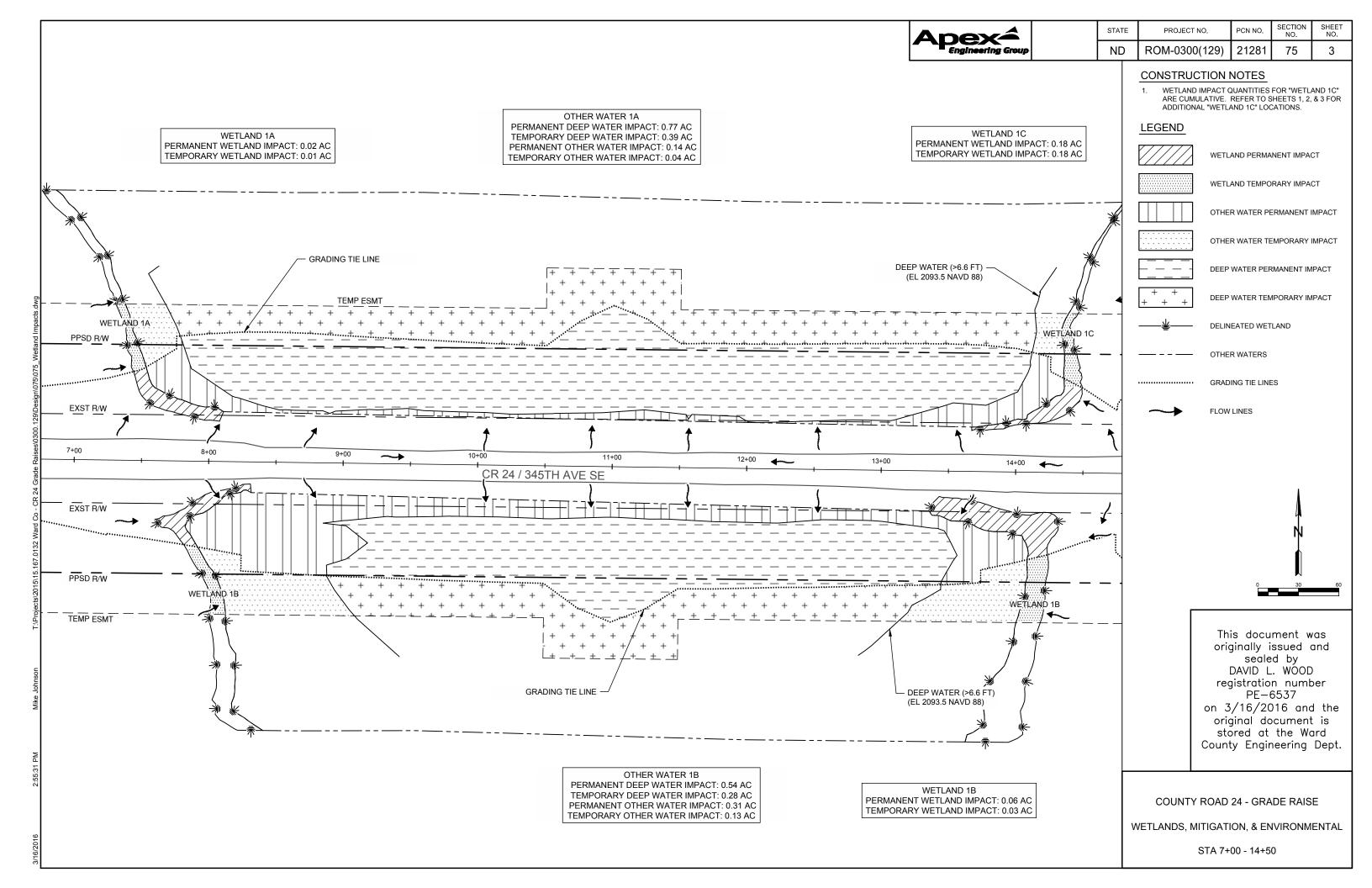
ENVIRONMENTAL COMMITMENTS CONT.

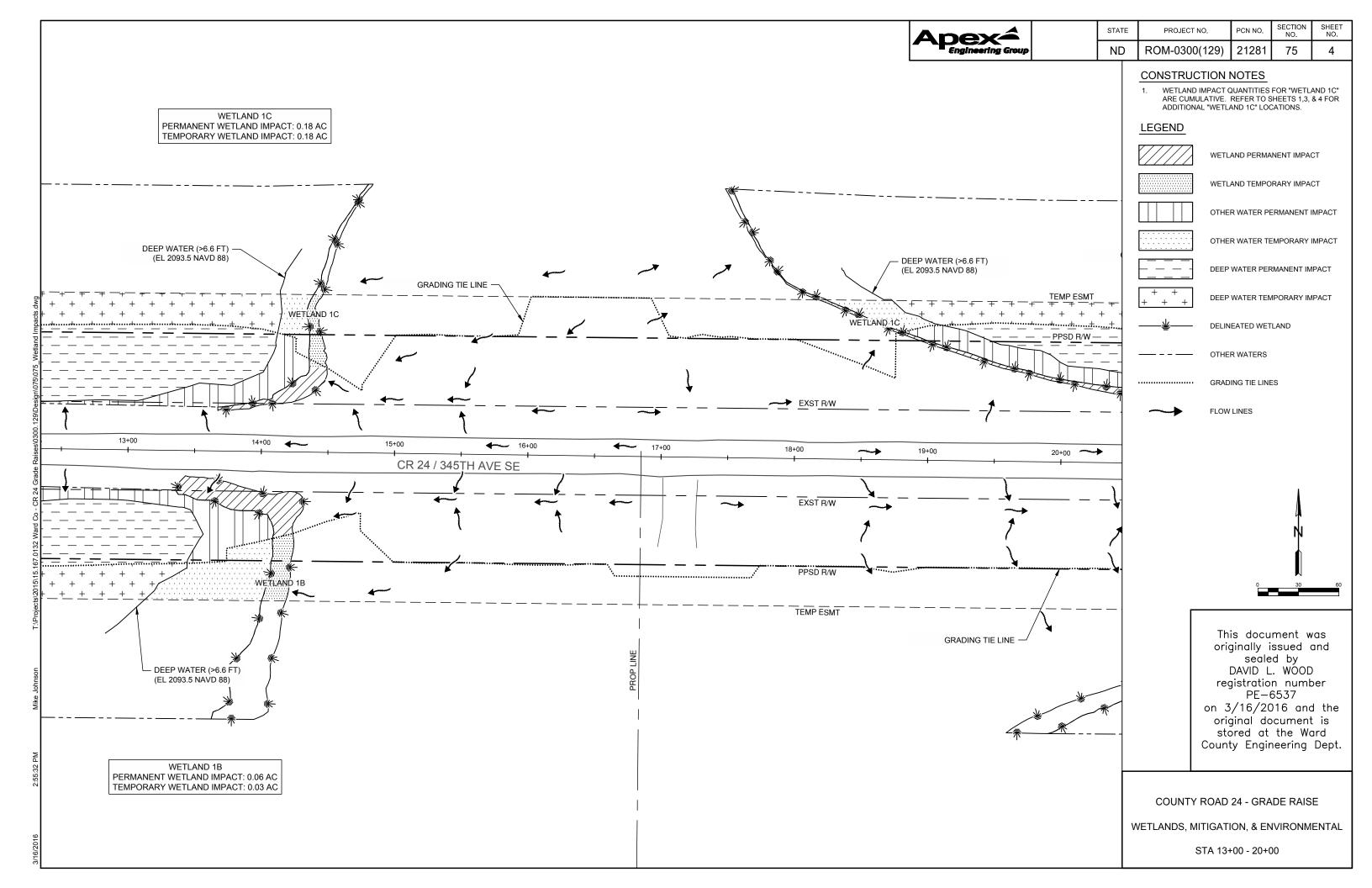
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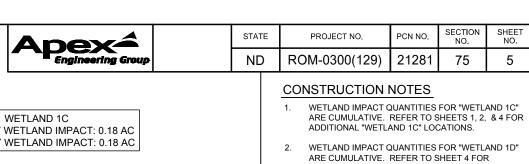
COUNTY ROAD 24 - GRADE RAISE
ENVIRONMENTAL COMMITMENTS

¹ A wetland Jurisdictional Determination was issued by the USACE on 2/22/2016; NWO-2015-2382-BIS.

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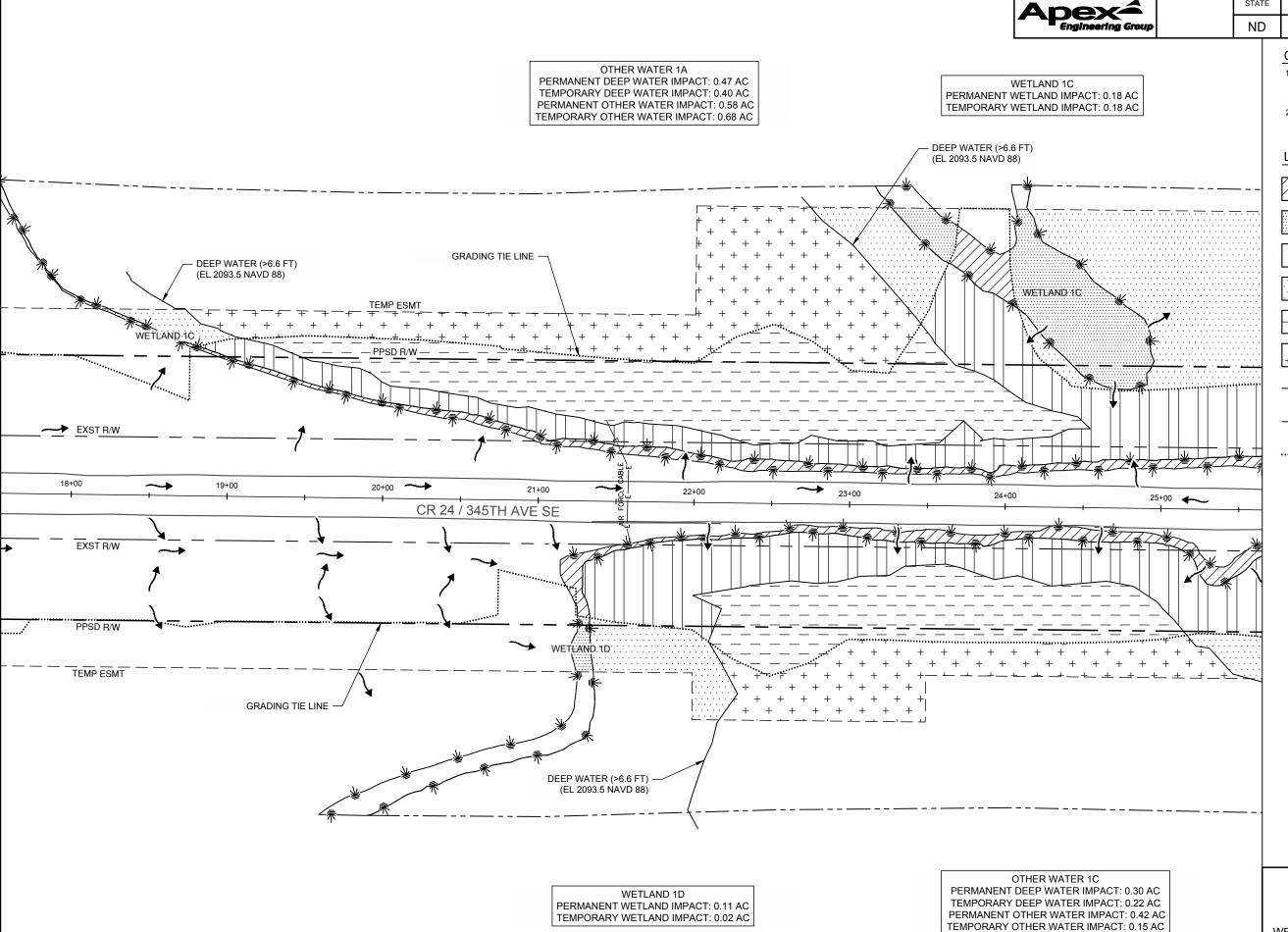


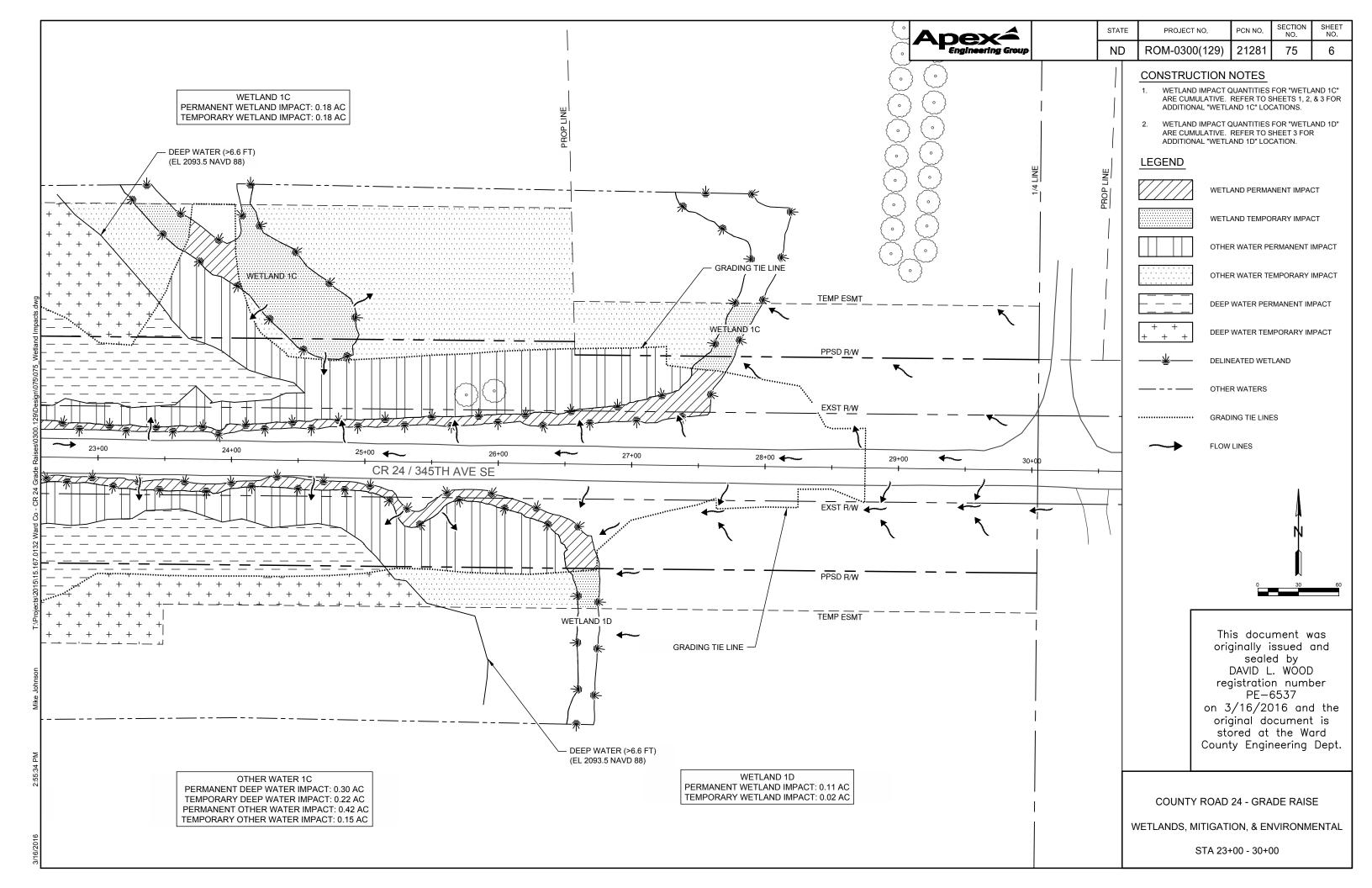
ADDITIONAL "WETLAND 1D" LOCATION. LEGEND WETLAND PERMANENT IMPACT WETLAND TEMPORARY IMPACT OTHER WATER PERMANENT IMPACT OTHER WATER TEMPORARY IMPACT DEEP WATER PERMANENT IMPACT DEEP WATER TEMPORARY IMPACT DELINEATED WETLAND OTHER WATERS GRADING TIE LINES FLOW LINES

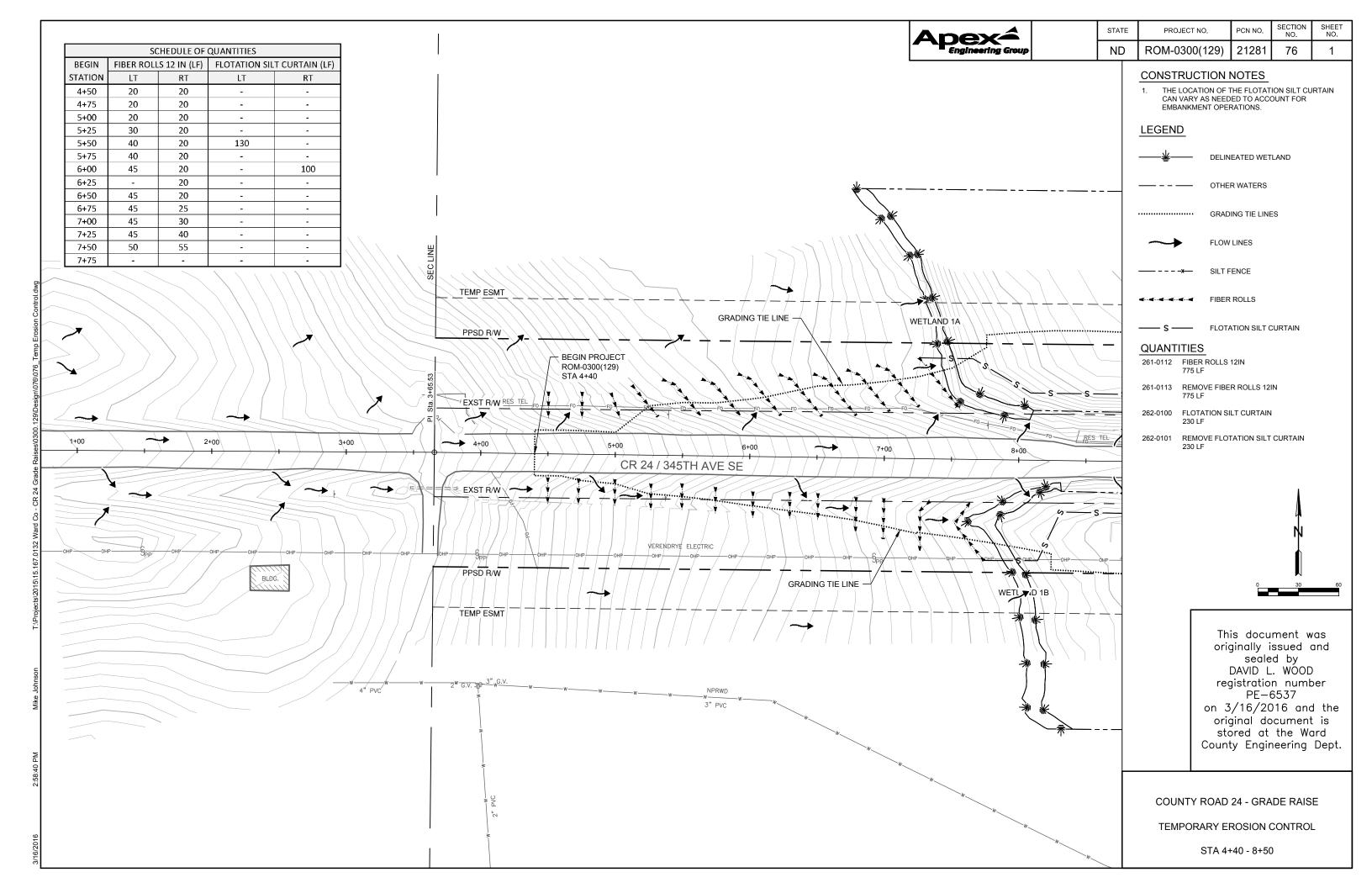
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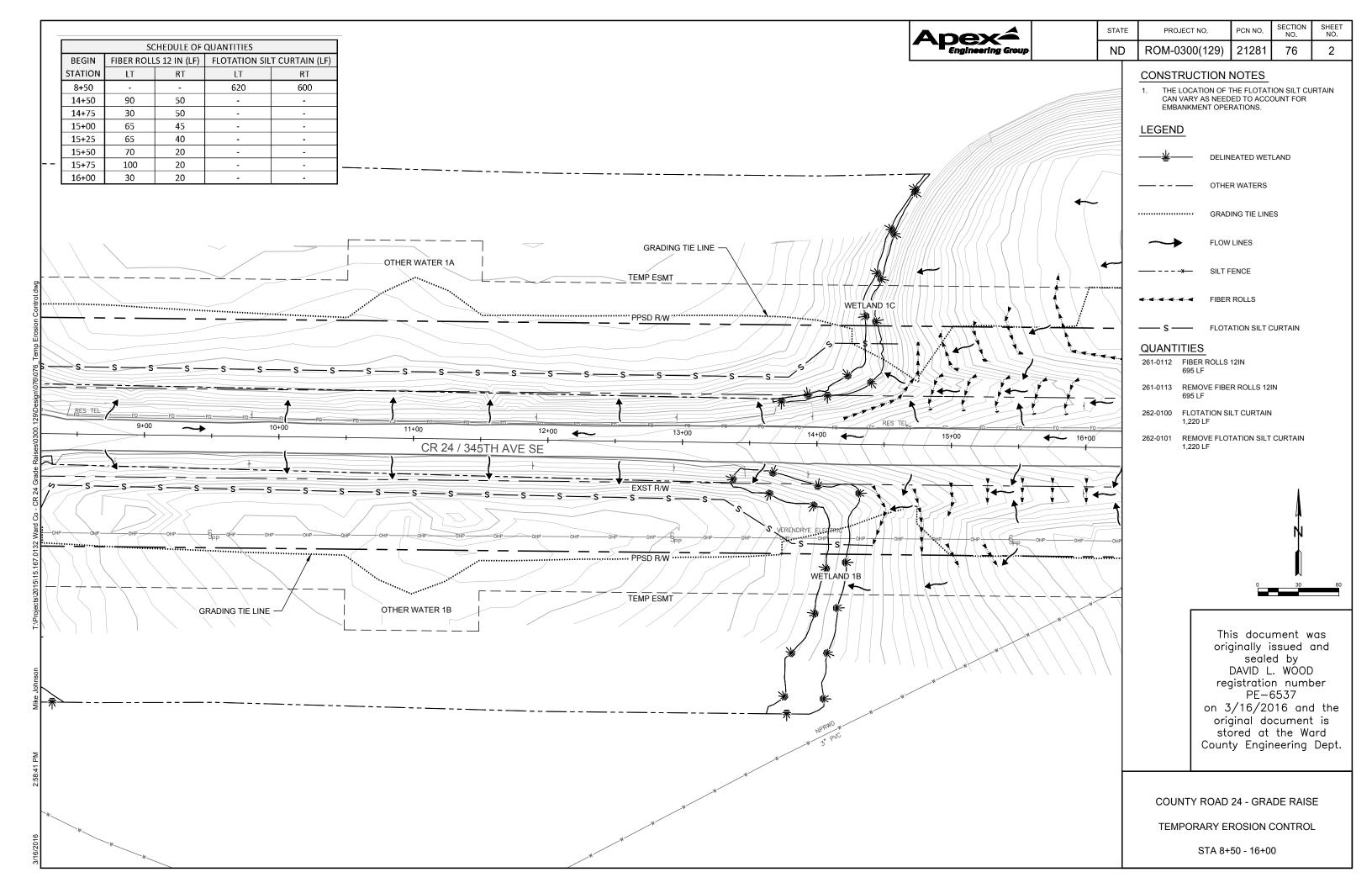
COUNTY ROAD 24 - GRADE RAISE
WETLANDS, MITIGATION, & ENVIRONMENTAL

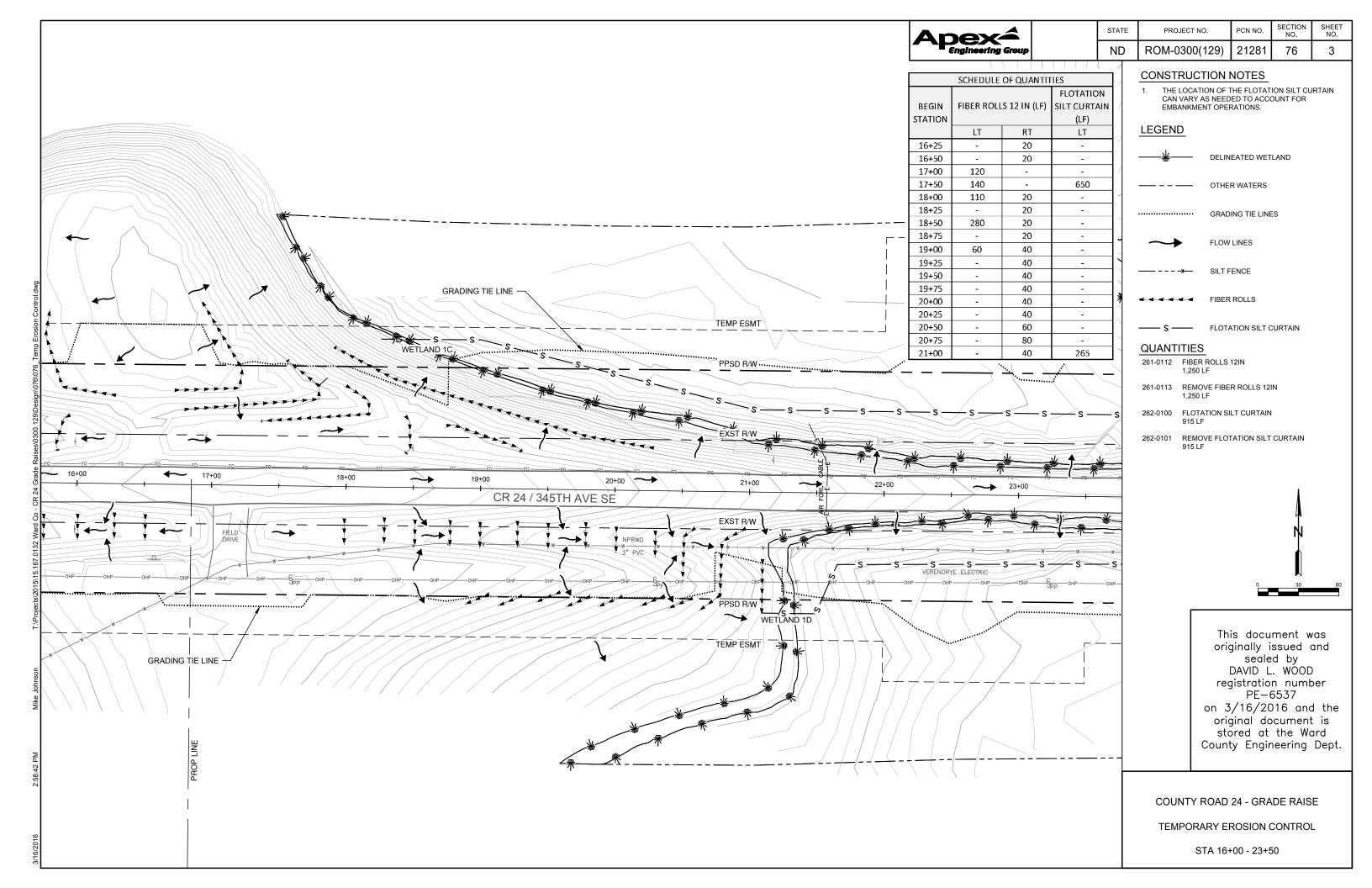
STA 18+00 - 25+00

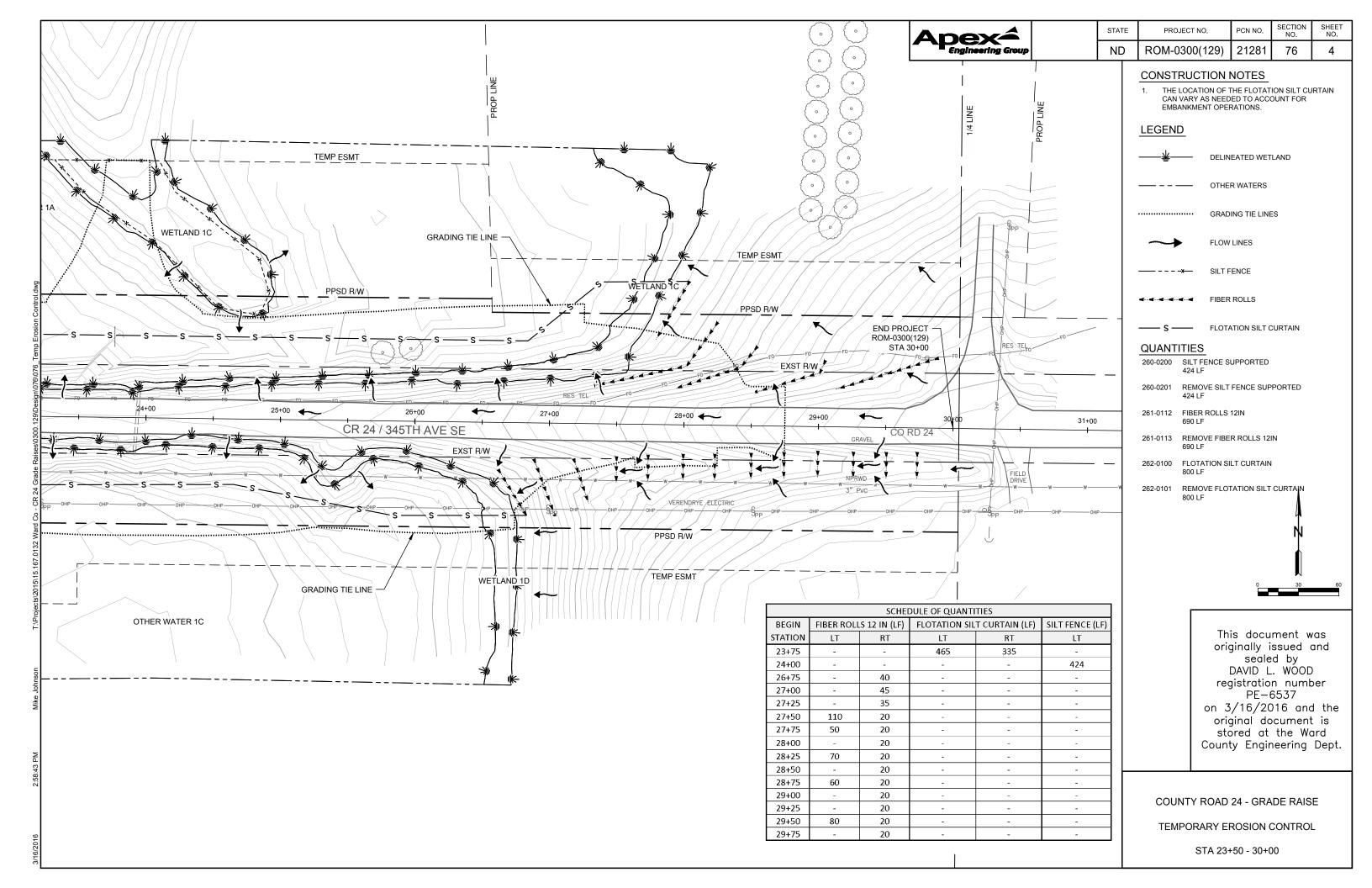


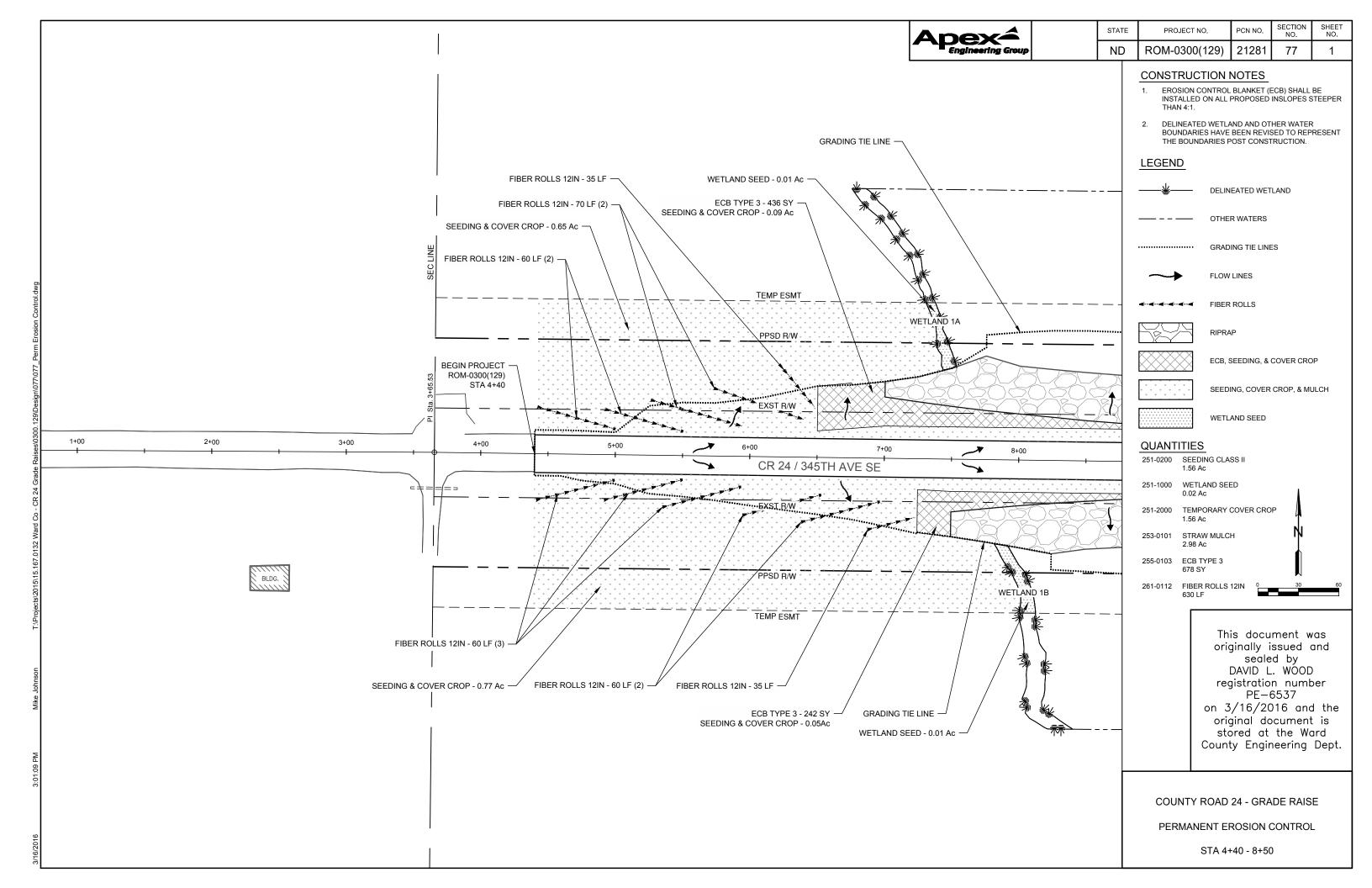


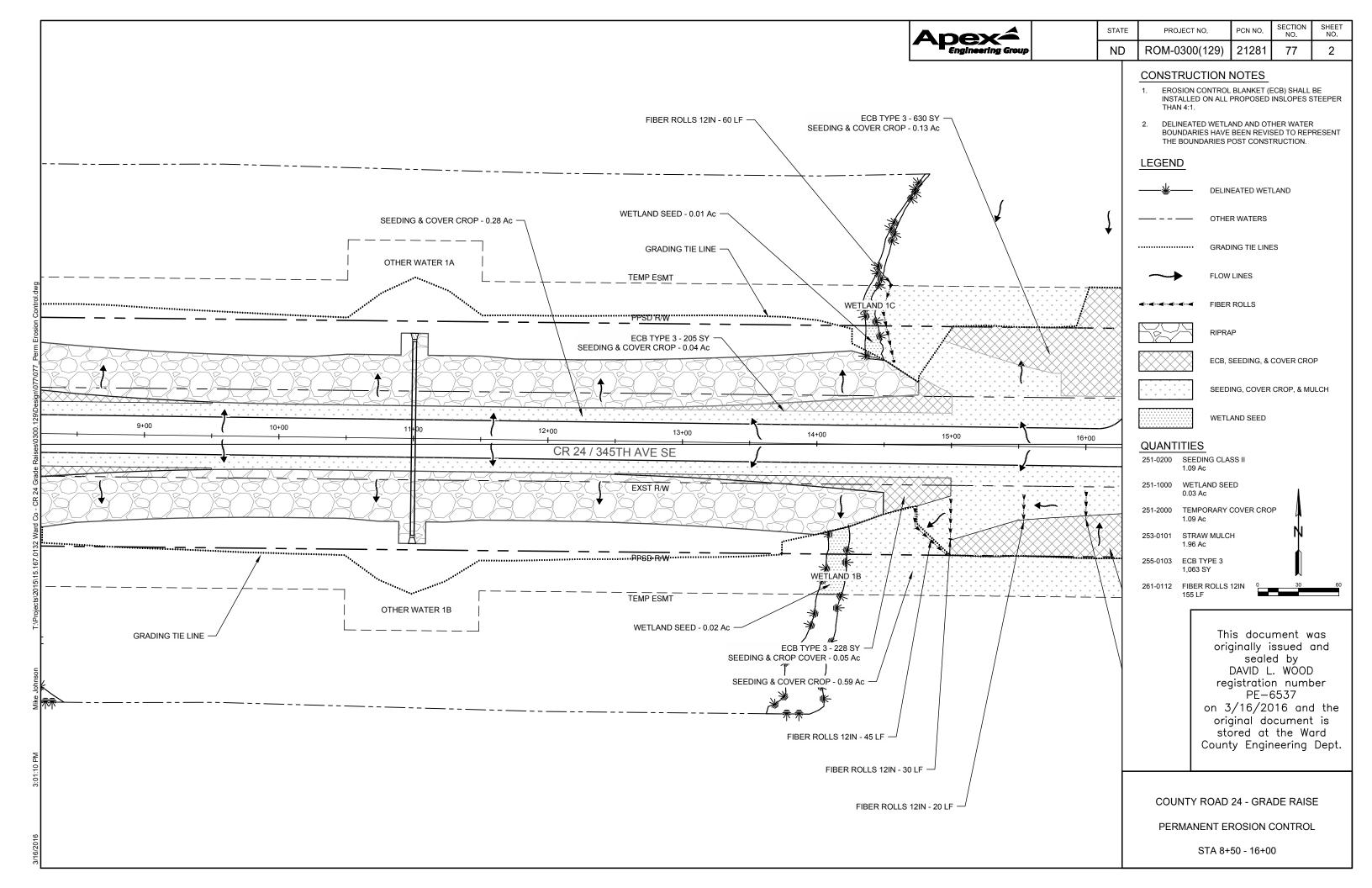


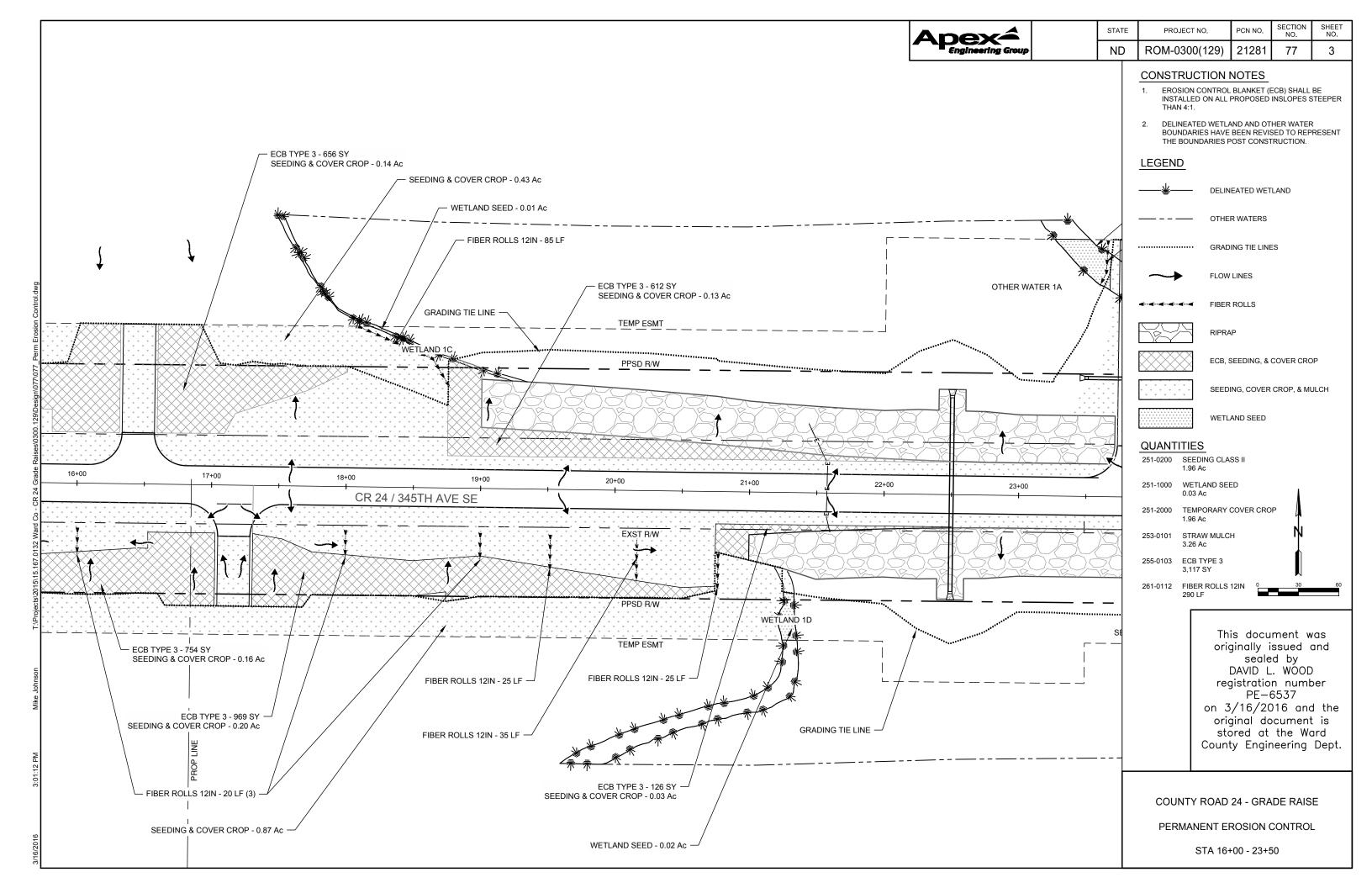


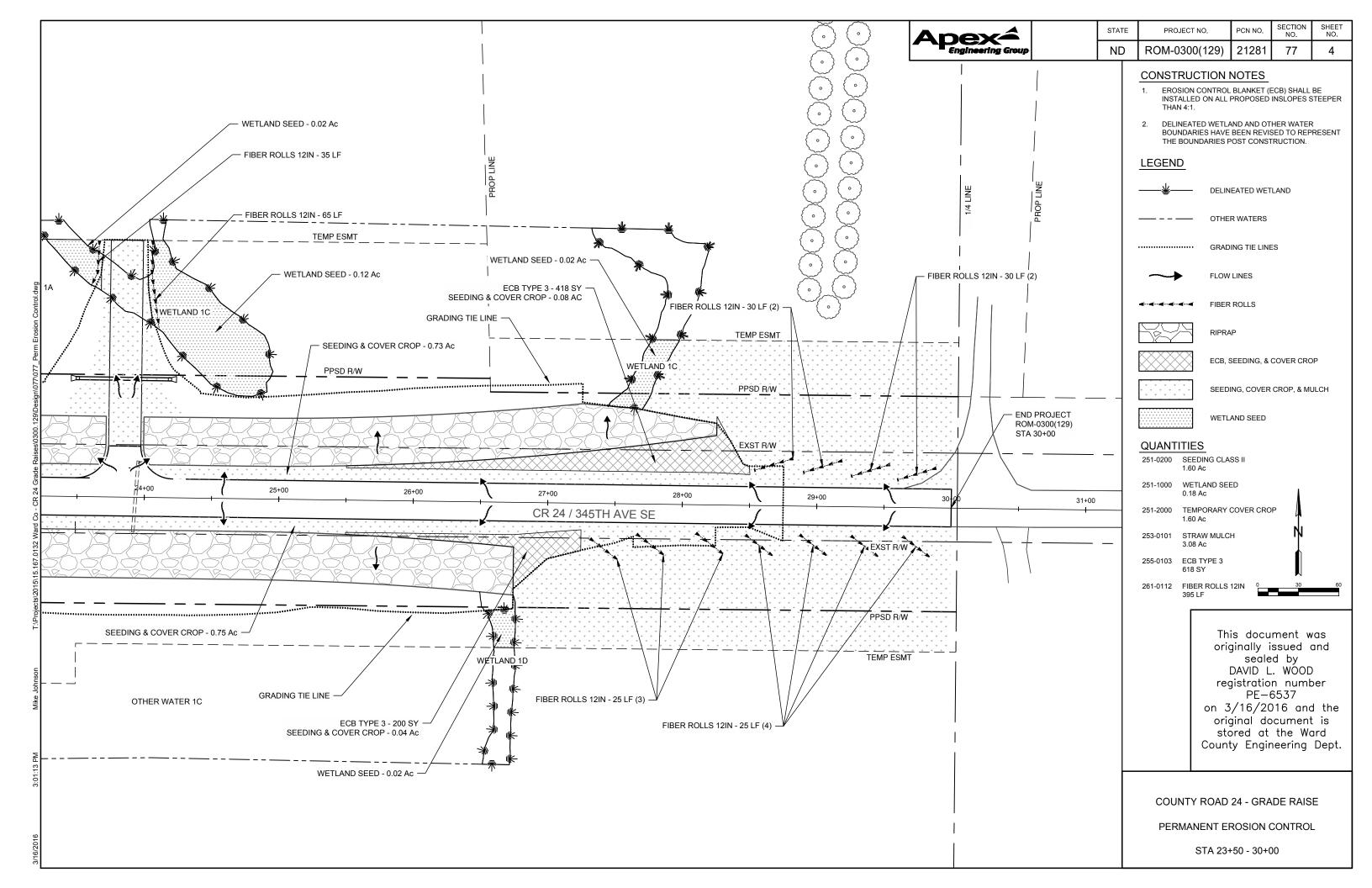












PRELIMINARY SURVEY COORDINATE AND CURVE DATA - COUNTY ROAD 24 - GRADE RAISE



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	HORIZON	ITAL ALIGNMEN	NT .	CURV	E DATA		US PUBLIC LAN	D SURVEY DA	ATA	SUR	VEY CONTR	ROL POINTS	
PNT	STATION	NORTHING	EASTING	ARC DE	EFINITION	DESC.	SEC-TWP-RGE	NORTHING	EASTING	PNT NORTHING		ELEV STATION	N OFFSET
							SEC 22 T151N R83W SEC 23 T151N R83W	321034.47 326282.23	1776747.92 1782083.06		ONTROL POINT DE		
						W1/4 COR	SEC 23 T151N R83W	323662.33	1779417.28	F	RIMARY C	ONTROL	
						SW COR	SEC 23 T151N R83W	321015.39	1779391.88			2128.55 N/A	N/A
						S1/4 COR	SEC 23 T151N R83W	320988.42	1782030.66	С	P*REBAR		
						SE COR	SEC 23 T151N R83W	320961.38	1784669.54			2154.60 N/A	N/A
							SEC 26 T151N R83W	318371.88	1779361.30	С	P*REBAR		
						SW COR	SEC 26 T151N R83W	315728.29	1779330.91				
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				REFERENC	CE MARKERS							seal	led by ERICKSON
opunsor				R Mkr# NORTHING EAS	STING STATION OFFSET							registrati	on number
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										ALL COORDINATES AND N		original o stored a	locument is t the Ward
Σ										THE INTERNATIONAL FO		County Eng	ineering Dept.
77.77.7						ASSU	MED COORDINATES		IN	ITIALIZING BENCH MARK NDGPS Stations (OPUS)		<u> </u>	
						ALL CO	OORDINATES ON THIS SHE TY GROUND COORDINATES	ET ARE WARD	NA NA		COUN	ITY ROAD 24 - GR	ADE RAISE
NOTES:					DATE SURVEY COMPLETED 02/17/16	THEY	ARE DERIVED FROM THE N RENCE FRAME; NORTH DAK	AD83(2011)		SVD-29		SURVEY COORDI	NATE
8/16/2016						COMBI	INATION FACTOR (CF) = 0.9	998530	—	OID 09	-		

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - COUNTY ROAD 24 - GRADE RAISE



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НО	RIZONTAL A	LIGNMENT (PF	R_CR24)			CURV	'E DATA				US PUBLIC LAN	ID SURVEY D	ATA		SUR	/EY CONTF	ROL POINTS	
PNT	STATION	NORTHING	EASTING			ARC DE	EFINITION		DE	ESC.	SEC-TWP-RGE	NORTHING	EASTIN	G PN1		EASTING ONTROL POINT DE	ELEV STATION	OFFSET
PI	0+00.00	321,017.31	1,779,026.35												C	SINTROL FOINT DE	SCRIFTION	
SW COR 2	23 3+65.53	321,015.39	1,779,391.88												_			
PI	33+34.33	320,976.17	1,782,360.42												Р	RIMARY CO	ONTROL	
		· · · · · · · · · · · · · · · · · · ·												PN	NORTHING	FACTING	ELEV STATION	OFFSET
	HORIZON:	TAL ALIGNMEN	JT											PIN		EASTING ONTROL POINT DE		OFFSET
		er Island Approa																
PNT	STATION	NORTHING	EASTING															
PI	1+00.00	320,988.71	1,781,411.17															
₽ PI	2+91.07	321,179.77	1,781,413.69															
Tate. dv	2101.07	021,1707	1,701,710.00															
	HORIZON:	TAL ALIGNMEN	JT															
urvey		kakoon Approac																
PNT	STATION	NORTHING	EASTING															
PI PI	1+00.00	320,997.53	1,780,743.23															
PI	2+10.96	320,886.59	1,780,741.76															
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PNT	STATION	NORTHING	EASTING				+											
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Section 1																	registration PE-6	3537
≥																	on 3/16/20 original do	016 and the ocument is
															DORDINATES AND N THIS DOCUMENT DI		stored at County Engir	ocument is the Ward
2														THE	NTERNATIONAL FC	OT DEFINITION.	County Engli	leering Dept.
										ASSUM	MED COORDINATES				BENCH MARK			
										_	OORDINATES ON THIS SH	EET ARE WARD		NDGPS St	ations (OPUS)	COUN	ITY ROAD 24 - GRA	ADE RAISE
NOTES:							DATE SLIDV	/EY COMPLETED 0		COUNT	TY GROUND COORDINATE ARE DERIVED FROM THE	S.		NGVD-29			SURVEY COORDINA	
5016							DATE GOILVI	L. JOWN LETED 0		REFERI	ENCE FRAME; NORTH DA NATION FACTOR (CF) = 0.	KOTA NORTH ZONE		GEOID 09			JORVET GOORDINA	MIL
1/9/2										COMBII				GEOID 12A				



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SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	-
G20-1-60	60"x24"	ROAD WORK NEXT MILES	2	34	68
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	48"x24"	END ROAD WORK	2	19	38
G20-4-36 G20-10-108	36"x18" 108"x48"	PILOT CAR FOLLOW ME (Mounted to back of pilot car) CONTRACTOR SIGN	1	18 64	18
G20-10-108 G20-50a-72	72"x36"	ROAD WORK NEXTMILES RT & LT ARROWS		37	
G20-50a-72	72"x24"	ROAD WORK NEXT MILES RT or LT ARROW		30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT	2	59	118
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24 M4-8-24	24"x12" 24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24 M4-9-30	30"x24"	DETOUR (Mounted on route marker post) DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		7 15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT OF LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AND AND IN OIL T(Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP	2	32	64
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back	2	5	10
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT	4	39	156
R2-1a-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36 R7-1-12	36"x12" 12"x18"	ONE WAY RIGHT or LEFT NO PARKING		13 11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48 W3-5-48	48"x48" 48"x48"	BE PREPARED TO STOP	2	35	70 70
W4-2-48	46 X46 48"x48"	SPEED REDUCTION AHEAD RIGHT or LEFT LANE TRANSITION SYMBOL	2	35 35	70
W5-1-48	46 x46 48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	ВИМР	2	35	70
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY	_	35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or FT.	2	35	70
W8-55-48 W8-56-48	48"x48" 48"x48"	TRUCKS CROSSING AHEAD or FT. TRUCKS EXITING HIGHWAY		35 35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL	+	35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL	+	35	
W13-1-24	24"x24"	MPH ADVISORY SPEED PLATE (Mounted on warning sign post)	1	11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	48"x48"	ROAD WORK AHEAD or _FT or _ MILE	2	35	70
W20-2-48	48"x48"	DETOUR AHEAD or FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or FT.		35	
W20-7a-48		FLAGGING SYMBOL	2	35	70
W20-7k-24	24"x18"	FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXTMILES (Mounted on warning sign post)	2	12	24
10/04 4 - 10	48"x48"	WORKERS SYMBOL	1	35	
W21-1a-48 W21-2-48	48"x48"	FRESH OIL		35	

W21-5a-48 48"x W21-5b-48 48"x W21-6a-48 48"x W21-50-48 48"x W21-51-48 48"x	8"x48" SHOULDER WORK 8"x48" RIGHT or LEFT SHOULDER CLOSED 8"x48" RIGHT or LEFT SHOULDER CLOSED AHEAD or FT. 8"x48" SURVEY CREW AHEAD 8"x48" BRIDGE PAINTING AHEAD or FT. 8"x48" MATERIAL ON ROADWAY		35 35 35 35	
W21-5b-48 48"x W21-6a-48 48"x W21-50-48 48"x W21-51-48 48"x	8"x48" RIGHT or LEFT SHOULDER CLOSED AHEAD or FT. 8"x48" SURVEY CREW AHEAD 8"x48" BRIDGE PAINTING AHEAD or FT. 8"x48" MATERIAL ON ROADWAY		35 35	
W21-6a-48 48"x W21-50-48 48"x W21-51-48 48"x	8"x48" SURVEY CREW AHEAD 8"x48" BRIDGE PAINTING AHEAD or FT. 8"x48" MATERIAL ON ROADWAY		35	
W21-50-48 48"x W21-51-48 48"x	8"x48" BRIDGE PAINTING AHEAD or FT. 8"x48" MATERIAL ON ROADWAY			
W21-51-48 48"x	8"x48" MATERIAL ON ROADWAY			
			35	
N22-8-48 48"x			35	
	8"x48" FRESH OIL LOOSE ROCK	·	35	
				-

PECIAL SIG	NS				

SP	EC	&	co	DE

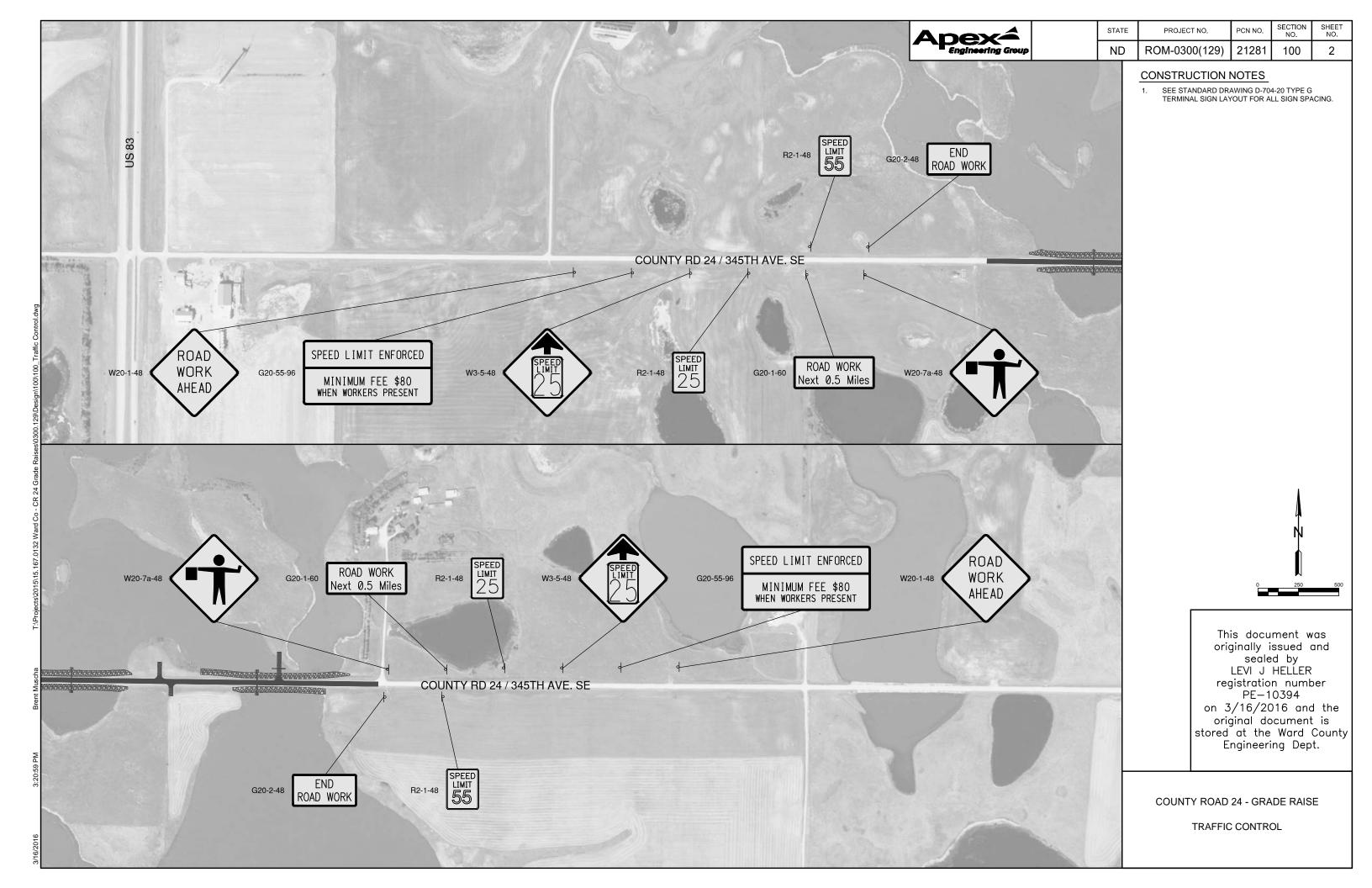
704-1000 TRAFFIC CONTROL SIGNS TOTAL UNITS 916

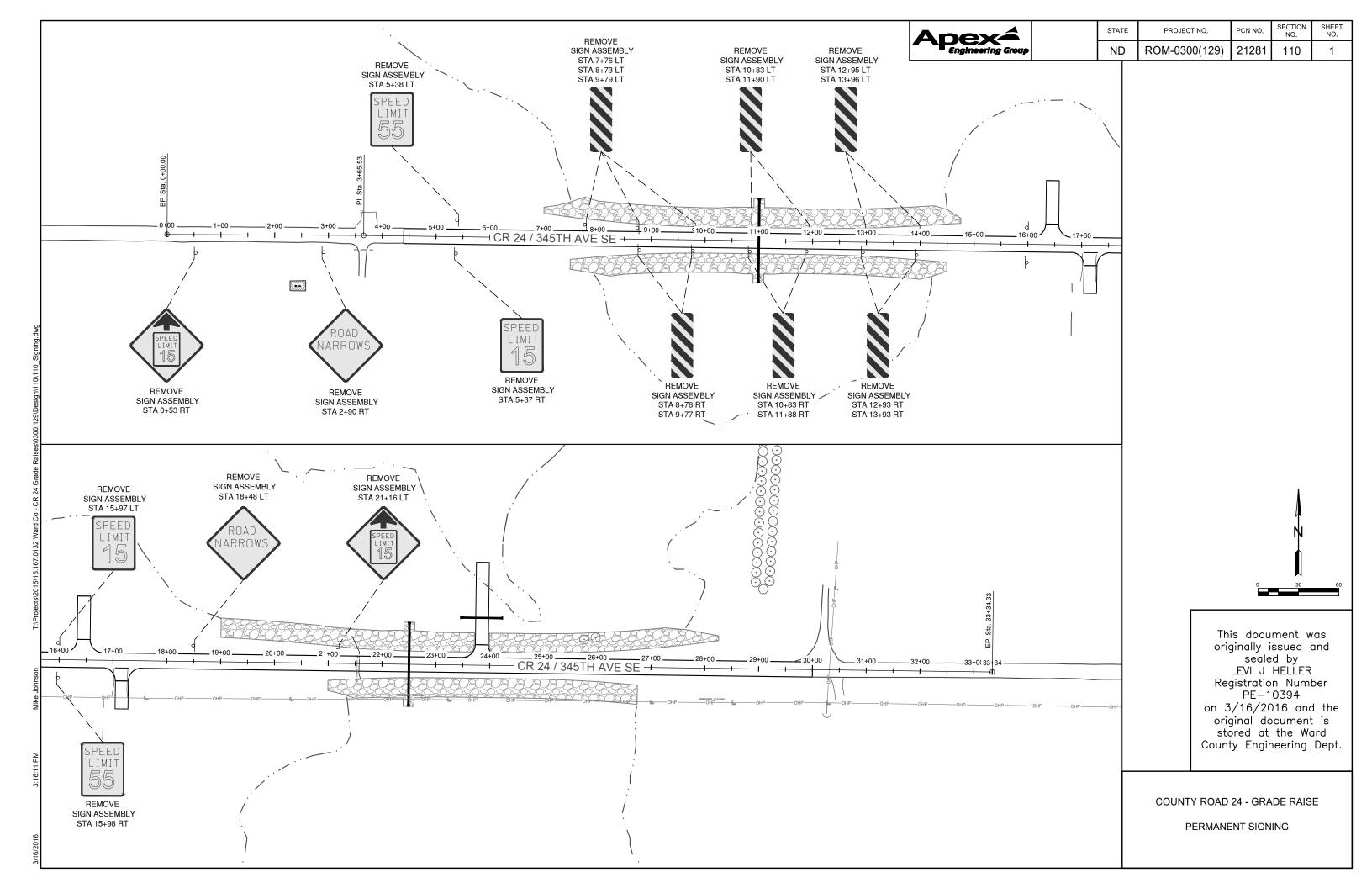
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	1700
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	2
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	60
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	120
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-1185	PILOT CAR	HR	700
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

This document was originally issued and sealed by LEVI J HELLER registration number PE-10394 on 3/16/2016 and the original document is stored at the Ward County Engineering Dept.

COUNTY ROAD 24 - GRADE RAISE

TRAFFIC CONTROL QUANTIES





?	This is a special text character used in the labeling	BV	butterfly valve	Ct	Court	ES	end section	
	of existing features. It indicates a feature that has	Вур	bypass	Xarm	cross arm	Engr	engineer	
	an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.	C Gdrl	cable guardrail	Xbuck	cross buck	ESS	environmental sensor st	.ation
	lack of description, location accuracy of purpose.	Calc	calculate	Xsec	cross sections	Eq	equal	
Abn	abandoned	Cd	candela	Xing	crossing	Eq	equat i on	
Abut	abutment	CIP	cast iron pipe	Xrd	Crossroad	Evgr	evergreen	
Ac	acres	СВ	catch basin	Crn	crown	Exc	excavation	
Adj	adjusted	CRS	cationic rapid setting	CF	cubic feet	Exst	existing	
Aggr	aggregate	C Gd	cattle guard	M3	cubic meter	Exp	expansion	
Ahd	ahead	C To C	center to center	M3/s	cubic meters per second	Expy	Expressway	
ARV	air release valve	Cl or €	centerline	CY	cubic yard	E	external of curve	
Align	alignment	Cm	centimeter	Cy/mi	cubic yards per mile	Extru	extruded	
Al	alley	Ch	chain	Culv	culvert	FOS	factor of safety	
Alt	alternate	Chnlk	chain-link	C&G	curb & gutter	F	Fahrenheit	
Alum	aluminum	Ch Blk	channel block	CI	curb inlet	FS	far side	
ADA	Americans with Disabilities Act	Ch Ch	channel change	CR	curb ramp	F	farad	
A	ampere	Chk	check	CS	curve to spiral	Fed	Federal	
&	and	Chsld	chiseled	C	cut	FP	feed point	
Appr	approach	Cir	circle	Dd Ld	dead load	Ft	feet/foot	
Approx	approximate	CI	class	Defl	deflection	Fn	fence	
ACP	asbestos cement pipe	Cl	clay	Defm	deformed	 Fn P	fence post	
Asph	asphalt	CIF	clay fill	Deg or D	degree	FO	fiber optic	
AC	asphalt cement	CI Hvy	clay heavy	Dint	delineate	FB	field book	
Assmd	assumed	CI Lm	clay loam	Dintr	delineator	FD	field drive	
	at	CInt	clean-out	Depr	depression	F	fill	
@ Atten	attenuation	Clr	clear	Desc	description	FAA	••••	3.7
Atten	automatic traffic recorder			Desc	detail	FS	fine aggregate angularity fine sand	У
		CI&gr Co S	clearing & grubb i ng coal slack	DWP		FH		
Ave	Avenue		combination		detectable warning panel		fire hydrant	
Avg	average	Comb.		Dtr Die	detour	Fl	flange	
ADT	average daily traffic	Coml	commercial	Dia Dia	diameter	Flrd	flared	
Az	azimuth	Compr	compression	Dir	direction	FES	flared end section	
Bk	back	CADD	computer aided drafting & design	Dist	distance	F Bcn	flashing beacon	
BF	back face	Conc	concrete	DM	disturbed material	FA	flight auger sample	
Bs	backsight	Cond	conductor	DB	ditch block	FL	flow line	
Balc	balcony	Const	construction	DG	ditch grade	Ftg	footing	
B Wire	barbed wire	Cont	continuous	Dbl	double	FM	force main	
Barr	barricade	CSB	continuous split barrel sample	Dn	down	Fs	foresight	
Btry	battery	Contr	contraction	Dwg	drawing	Fnd	found	
Brg	bearing	Contr	contractor	Dr	drive	Fdn	foundation	
Bl	beehive inlet	CP	control point	Drwy	driveway	Frac	fractional	
Beg	begin	Coord	coordinate	DI	drop inlet	Frwy	freeway	
BM	bench mark	Cor	corner	D	dry density	Frt	front	
Bkwy	bikeway	Corr	corrected	Ea	each	FF	front face	
Bit	bituminous	CAES	corrugated aluminum end section	Esmt	easement	F Disp	fuel dispenser	
Blk	block	CAP	corrugated aluminum pipe	Е	East			
Bd Ft	board feet	CMES	corrugated metal end section	EB	Eastbound			
ВН	bore hole	CMP	corrugated metal pipe	Elast	elastomeric		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
BS	both sides	CPVCP	corrugated poly-vinyl chloride pipe	EL	electric locker		07-01-14	This
Bot	bottom	CSES	corrugated steel end section	E Mtr	electric meter		REVISIONS	is
DI I	Daylayand	000			-141-1		DATE CHANGE	

Elec

EDM

Ellipt

Emb

Emuls

Elev or El

electric/al

elevation

elliptical

embankment

emulsion/emulsified

electronic distance meter

CSP

С

Co

Crse

C Gr

CS

corrugated steel pipe

coulomb

County

course

course gravel

course sand

Blvd

Bndry

Brkwy

ВС

Br

Bldg

Boulevard

boundary

brass cap

breakaway

bridge

building

NORTH DAKOTA					
DEPARTMENT OF TRANSPORTATION					
07-01-14					
REVISIONS					
DATE	CHANGE				

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

NDDOT ABBREVIATIONS

PSD

Pvmt

passing sight distance

pavement

FFP	fuel filler pipes	IPn	Iron Pin	MC	modium auring
FLS	fuel leak sensor	IP		M	medium curing
			iron Pipe		mega
Furn	furnish/ed	Jt	joint	Mer	meridian
Gal	gallon	J	joule	M M/-	meter
Galv	galvan i zed	Jct	junction	M/s	meters per second
Gar	garage	K	kelvin	M	mid ordinate of curve
Gs L	gas line	Kn	kilo newton	Mi	mile
G Reg	gas line regulator	Kpa	kilo pascal	MM	mile marker
GMV	gas main valve	Kg	kilogram	MP	mile post
G Mtr	gas meter	Kg/m3	kilogram per cubic meter	MI	milliliter
GSV	gas service valve	Km	kilometer	Mm	millimeter
GVP	gas vent pipe	K	Kip(s)	Mm/hr	millimeters per hour
GV	gate valve	LS	Land Surveyor (licensed)	Min	minimum
Ga	gauge	LSIT	Land Surveyor In Training	Misc	miscellaneous
Geod	geodetic	Ln	lane	Mon	monument
GIS	Geographical Information System	Lg	large	Mnd	mound
G	giga	Lat	latitude	Mtbl	mountable
GPS	Global Positioning System	Lt	left	Mtd	mounted
Gov	government	L	length of curve	Mtg	mounting
Grd	graded/grade	Lens	lenses	Mk	muck
Gr	gravel	Lvl	level	Mun	municipal
Grnd	ground	LB	level book	N	nano
GWM	ground water monitor	LvIng	leveling	NGS	National Geodetic Survey
Gdrl	guardrail	Lht	light	NS	near side
Gtr	gutter	LP	light pole	Neop	neoprene
H Plg	H piling	Ltg	lighting	Ntwk	network
Hdwl	headwall	Lig Co	lignite coal	N	newton
На	hectare	Lig SI	lignite slack	N	North
Ht	height	LF	linear foot	NE	North East
HI	height of instrument	Liq	liquid	NW	North West
Hel	helical	LL	liquid limit	NB	Northbound
Н	henry	 	litre	No. or #	number
Hz	hertz	Lm	loam	Obsc	obscure(d)
HDPE	high density polyethylene	Loc	location	Obsc	observation
HM		LC	long chord	Ocpd	
HP	high mast				occupied
	high pressure	Long.	longitude	Ocpy	occupy
HPS	high pressure sodium	Lp	loop	Off Loc	office location
Hwy	highway	LD	loop detector	O/s	offset
Hor	horizontal	Lm	lumen	OC	on center
HBP	hot bituminous pavement	Lum	luminaire	C	one dimensional consolidation
HMA	hot mix asphalt	L Sum	lump sum	OC	organic content
Hr	hour(s)	Lx	lux	Orig	original
Hyd	hydrant	ML	main line	O To O	out to out
Ph	hydrogen ion content	M Hr	man hour	OD	outside diameter
l d	identification	MH	manhole	OH	overhead
In or "	inch	Mkd	marked	PMT	pad mounted transformer
Incl	inclinometer tube	Mkr	marker	Pg	pages
IMH	inlet manhole	Mkg	marking	Pntd	painted
ID	inside diameter	MA	mast arm	Pr	pair
Inst	instrument	Matl	material	Pnl	panel
Intchg	interchange	Max	maximum	Pk	park
Intmdt	intermediate	MC	meander corner	PK	Parker-Kalon nail
Intscn	intersection	Meas	measure	Pa	pascal

Mdn

MD

median

median drain

Inv

IM

invert

iron monument

Ped pedestrian PPP pedestrian pushbutton post Pen. penetration perforated Perf Per. perimeter PL pipeline Ы place P&P plan & profile PL plastic limit Ы plate Pt point PCC point of compound curve PC point of curve ΡI point of intersection PRC point of reverse curvature PΤ point of tangent POC point on curve POT point on tangent PΕ polyethylene PVC polyvinyl chloride PCC Portland Cement concrete Lb or # pounds PP power pole Preempt preemption Prefab prefabricated Prfmd preformed Prep preperation Press. pressure PRV pressure relief valve Prestr prestressed Pvt private PD private drive Prod. production/produce Prog programmed Prop. property Prop Ln property line

pedestal

Ped

Ppsd

PB

proposed

pull box

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NDDOT ABBREVIATIONS D-101-3

Qty quantity SN sign number Tan tangent Qtr Sig Т quarter signal tangent (semi) Si CI TS Rad or R radius silt clay tangent to spiral RR Si CI Lm Tel railroad silty clay loam telephone Si Lm Rlwy railway silty loam Tel B Telephone Booth Rsd raised Sgl single Tel P telephone pole RTP random traverse point SC slow curing Τv television SS slow setting Rge or R Temp temperature range Sm RC rapid curing small Temp temporary S TBM Rec record South temporary bench mark SE South East Rcy Τ tesla recycle SW South West RAP Τ thinwall tube sample recycled asphalt pavement SB **RPCC** recycled portland cement concrete Southbound T/mi tons per mile Ref reference Sp spaces Ts topsoil R Mkr reference marker Spcl special Twp or T township SA RMreference monument special assembly Traf traffic SP Refl reflectorized special provisions **TSCB** traffic signal control box G RCB Tr reinforced concrete box specific gravity trail **RCES** Spk reinforced concrete end section spike Transf transformer RCP SC spiral to curve TB reinforced concrete pipe transit book ST RCPS spiral to tangent Trans transition reinforced concrete pipe sewer SB Reinf reinforcement split barrel sample TT transmission tower Res reservation SH sprinkler head Trans transverse Ret retaining SV sprinkler valve Trav traverse Sq TP Rev square traverse point reverse SF Rt square feet Trtd treated right R/W Km2 Trmt right of way square kilometer treatment Riv M2 Qc triaxial compression river square meter SY Rd **TERO** road square yard tribal employment rights ordinance Rdbd Stk Tpl road bed stake triple TP Std turning point Rdwy roadway standard **RWIS** Ν roadway weather information system standard penetration test Тур typical Rk rock Std Specs standard specifications Qu unconfined compressive strength Rt route Sta station Ugrnd underground Sta Yd USC&G US Coast & Geodetic Survey Salv salvage(d) station yards US Geologic Survey Sd sand Stm L steam line USGS Sdy CI sandy clay SEC steel encased concrete Util utility Sdy CI Lm sandy clay loam SMA stone matrix asphalt VG valley gutter Sdy FI sandy fill SSD stopping sight distance Vap vapor Sdy Lm sandy loam SD storm drain Vert vertical San sanitary sewer line St street VC vertical curve SPP VCP Sc scoria structural plate pipe vitrified clay pipe SPPA Sec seconds structural plate pipe arch ٧ volt Sec section Str structure Vol volume SL Subd subdivision Wkwy walkway section line W Sep separation Sub subgrade water content Sub Prep WGV Seq sequence subgrade preperation water gate valve Serv Ss WL water line service subsoil Sh SE superelevation WM water main shale SS Sht sheet supplement specification WMV water main valve Shtng supplemental sheeting Supp W Mtr water meter surfacing WSV Shldr shoulder Surf water service valve Sw sidewalk Surv survey WW water well S W siemens Sym symmetrical watt SD SI systems international Wrng sight distance wearing

Wb weber WIM weigh in motion W west WB westbound Wrng wiring W/ with W/o without WC witness corner WGS world geodetic system

Z zenith

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

702COM 702 Communications
ACCENT Accent Communications
AGASSIZ WU Agassiz Water Users Incorporated
AGC Assiociated General Contractors of America

All PI Alliance Pipeline

ALL SEAS WU All Seasons Water Users Association
AMOCO PI Amoco Pipeline Company
AMRDA HESS Amerada Hess Corporation

AT&T AT&T Corporation

B PAW Bear Paw Energy Incorporated

BAKER ELEC Baker Electric

BASIN ELEC
BEK TEL
BELLE PL
Belle Fourche Pipeline Company
BASIN ELEC
Basin Electric Cooperative Incorporated
Belle Fourche Pipeline Company

BLM Bureau of Land Management
BNSF Burlington Northern Santa Fe Railway

BOEING Boeing

BRNS RWD Barnes Rural Water District
BURK-DIV ELEC Burke-Divide Electric Cooperative

BURL WU Burleigh Water Users

Cable One Cable One CABLE SERV Cable Services

CAP ELEC
Capital Electric Cooperative Incorporat
CASS CO ELEC
CASS RWU
CASS RWU
CAV ELEC
Cass Rural Water Users Incorporated
CAV ELEC
Cavalier Rural Electric Cooperative

CBLCOM Cablecom Of Fargo CENEX PL Cenex Pipeline

CENT PL WATER DIST Central Pipe Line Water District
CENT PWR ELEC Central Power Electric Cooperative

COE Corps of Engineers **CONS TEL** Consolidated Telephone CONT RES Continental Resource Inc CPR Canadian Pacific Railway DOE Department Of Energy DAK CARR Dakota Carrier Network DAK CENT TEL Dakota Central Telephone DAK RWD Dakota Rural Water District DGC Dakota Gasification Company

DICKEY R NET Dickey Rural Networks

DICKEY RWU Dickey Rural Water Users Association

DICKEY TEL Dickey Telephone
DNRR Dakota Northern Railroad
DOME PL Dome Pipeline Company

DVELEC Dakota Valley Electric Cooperative
DVMW Dakota, Missouri Valley & Western
ENBRDG Enbridge Pipelines Incorporated

ENVENTIS Enventis Telephone
FALK MNG Falkirk Mining Company

FHWA Federal Highway Administration
G FKS-TRL WD Grand Forks-traill Water District
GETTY TRD & TRAN Getty Trading & Transportation
GLDN W ELEC Golden West Electric Cooperative
GRGS CO TEL Griggs County Telephone

GT PLNS NAT GAS Great Plains Natural Gas Company
HALS TEL Halstad Telephone Company

IDEA1 Idea1

INT-COMM TEL Inter-Community Telephone Company
KANEB PL Kaneb Pipeline Company
KEM ELEC Kem Electric Cooperative Incorporated

KOCH GATH SYS

Koch Gathering Systems Incorporated

LKHD PL

Lakehead Pipeline Company

LNGDN RWU Langdon Rural Water Users Incorporated

LWR YELL R ELEC Lower Yellowstone Rural Electric
MCKNZ CON McKenzie Consolidated Telcom
MCKNZ ELEC McKenzie Electric Cooperative

MCKNZ WRD McKenzie County Water Resource District

MCLEOD McLeod USA

MCLN ELEC McLean Electric Cooperative MCLN-SHRDN R WAT McLean-Sheridan Rural Water

MDU Montana-dakota Utilities
MID-CONT CABLE Mid-Continent Cable

MIDSTATE TEL Midstate Telephone Company
MINOT CABLE Minot Cable Television
MINOT TEL Minot Telephone Company
MISS W W S Missouri West Water System

MNKOTA PWR Minnkota Power

MOR-GRAN-SOU ELEC Mor-gran-sou Electric Cooperative MOUNT-WILLI ELEC Mountrail-williams Electric Cooperative

MRE LBTY TEL Moore & Liberty Telephone
MUNICIPAL City Water And Sewer
MUNICIPAL City Of '......'

N CENT ELEC
North Central Electric Cooperative
N VALL W DIST
NOrth Valley Water District
ND PKS & REC
North Dakota Parks And Recreation
ND TEL
North Dakota Telephone Company
NDDOT
North Dakota Department of Transportation

NDSU SOIL SCI DEPT NDSU Soil Science Department

NEMONT TEL Nemont Telephone

NODAK R ELEC
NOON FRMS TEL
Noonan Farmers Telephone Company

NPR Northern Plains Railroad
NSP Northern States Power

NTH PRAIR RW Northern Prairie Rural Water Association

NTHN BRDR PL Northern Border Pipeline

NTHN PLNS ELEC Northern Plains Electric Cooperative Incorporated

NTHWSTRN REF Northwestern Refinery Company
NW COMM Northwest Communication Cooperation

ONEOK Oneok gas

OSHA Occupational Safety and Health Administration

OTTR TL PWR Otter Tail Power Company
P L E M Prairielands Energy Marketing
POLAR COM Polar Communications

PVT ELEC Private Electric
QWEST Qwest Communications
R&T W SUPPLY R & T Water Supply Association
RAMSEY R SEW Ramsey Rural Sewer Association
RAMSEY RW Ramsey Rural Water Association
RAMSEY UTIL Ramsey County Rural Utilities

RED RIV TEL Red River Rural Telephone **RESVTN TEL** Reservation Telephone ROBRTS TEL Roberts Company Telephone R-RIDER ELEC Roughrider Electric Coop Red River Valley & Western Railroad RRVW RSR ELEC R.S.R. Electric Cooperative SEWU South East Water Users Incorporated SCOTT CABLE Scott Cable Television Dickinson SHERDN ELEC Sheridan Electric Cooperative

SHEYN VLY ELEC
SKYTECH
Skyland Technologies Incorporated
SLOPE ELEC
SOURIS RIV TELCOM
Sheyenne Valley Electric Cooperative
Skyland Technologies Incorporated
Slope Electric Cooperative Incorporated
Souris River Telecommunications

ST WAT COMM State Water Commission
STATE LN WATER State Line Water Cooperative

STER ENG Sterling Energy

STUT RWU Stutsman Rural Water Users
SW PL PRJ Southwest Pipeline Project
T M C Turtle Mountain Communications

TCI TCI of North Dakota

TESORO HGH PLNS PL
TRI-CNTY WU
TRL CO RWU
UNTD TEL
Tesoro High Plains Pipeline
Tri-County Water Users Incorporated
Traill County Rural Water Users
United Telephone

UPPR SOUR WUA

Upper Souris Water Users Association

US SPRINT U.S. Sprint

USAF MSL CABLE
USFWS
US Fish and Wildlife Service
USW COMM
U.S. West Communications
VRNDRY ELEC
W RIV TEL
West River Telephone Incorporated
WEB
U.S.A.F. Missile Cable
US Fish and Wildlife Service
West Communications
Verendrye Electric Cooperative
West River Telephone Incorporated
W.E.B. Water Development Association

WILLI RWA Williams Rural Water Association
WILSTN BAS PL Williston Basin Interstate Pipeline Company
WLSH RWD Walsh Water Rural Water District

WOLVRTN TEL Wolverton Telephone

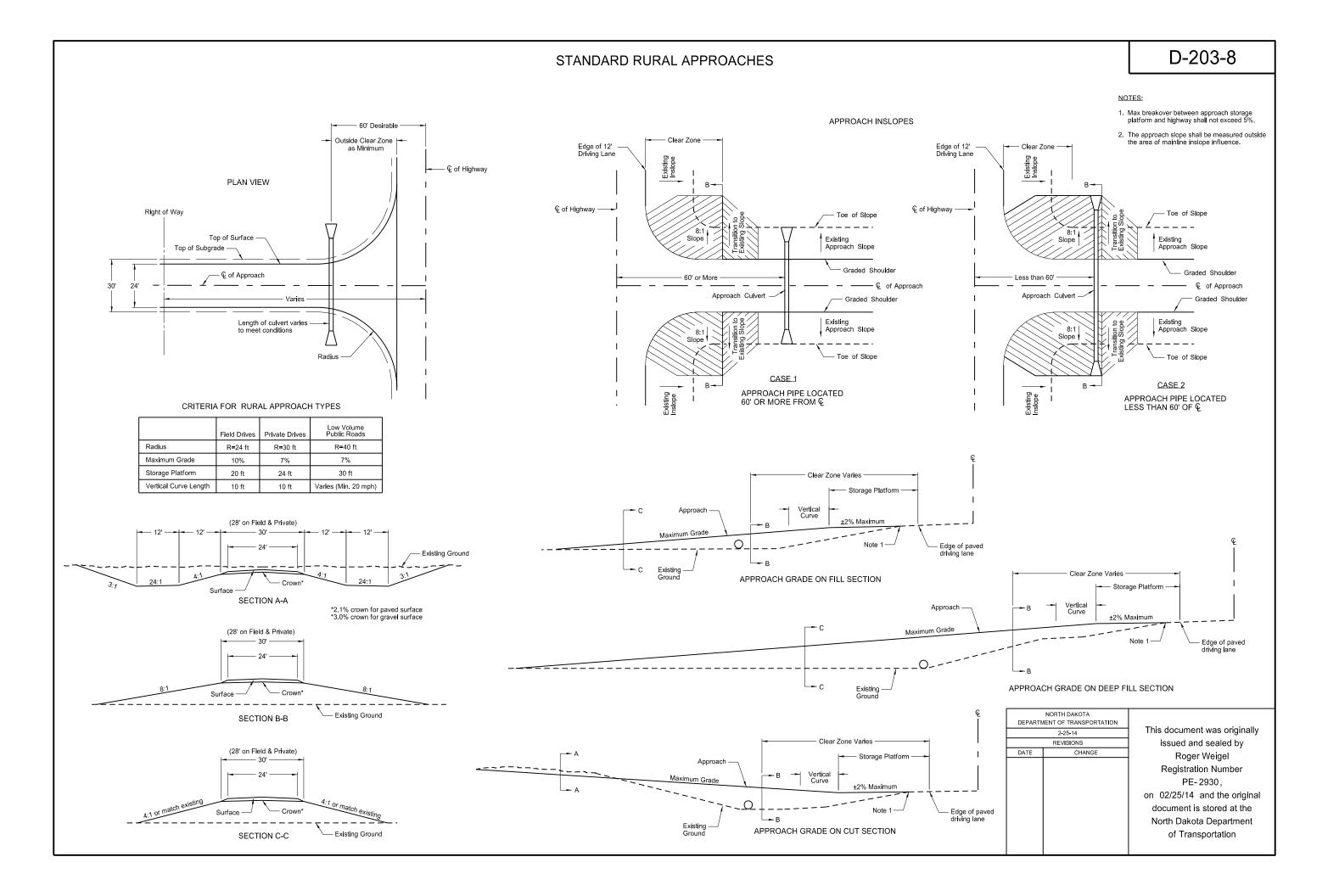
Xcel Energy

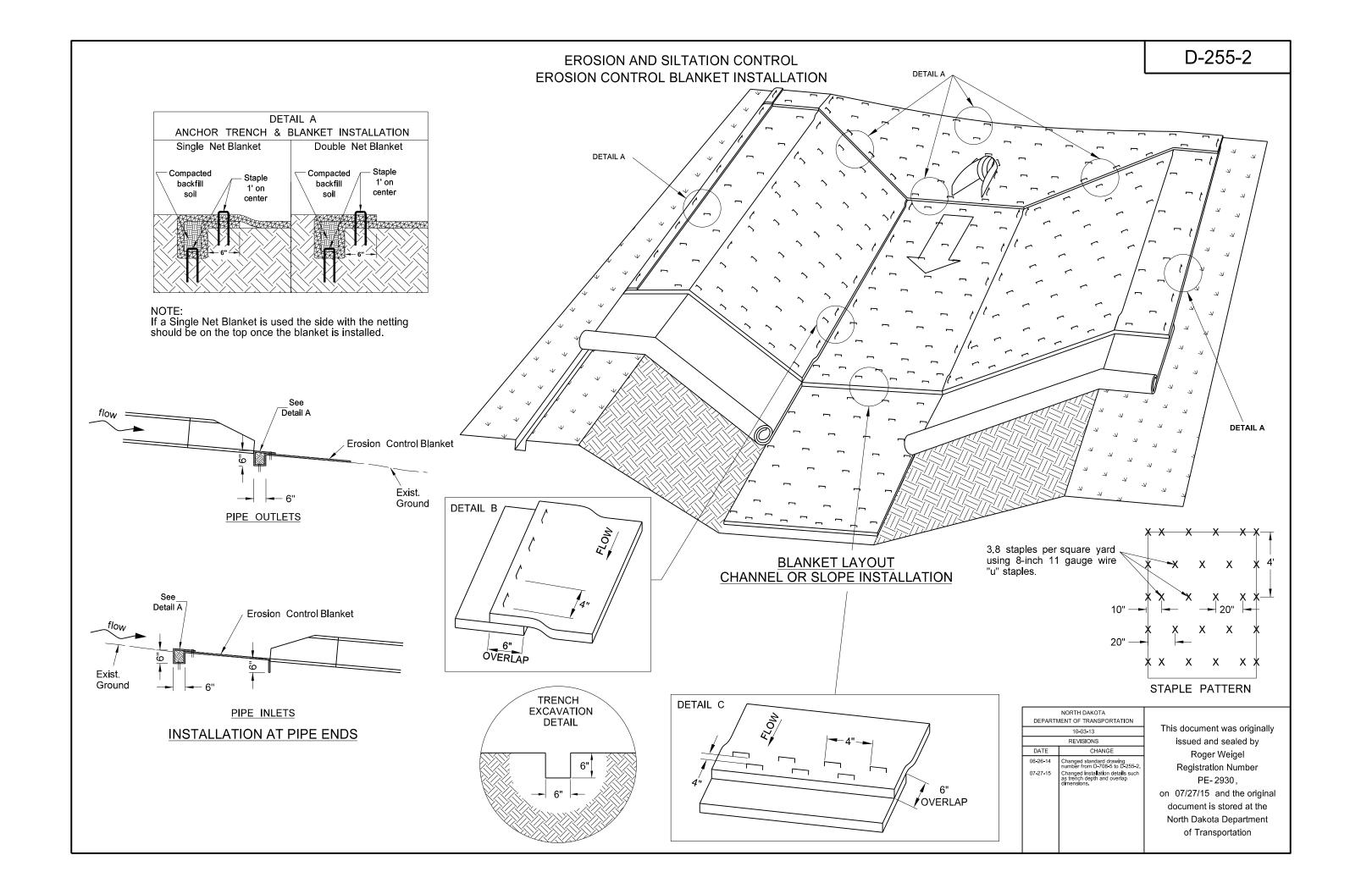
XLENER

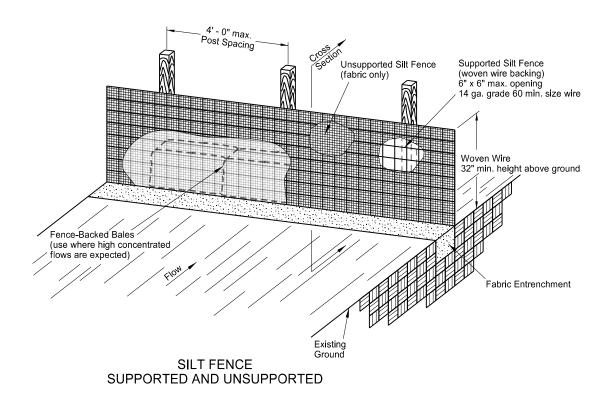
YSVR Yellowstone Valley Railroad

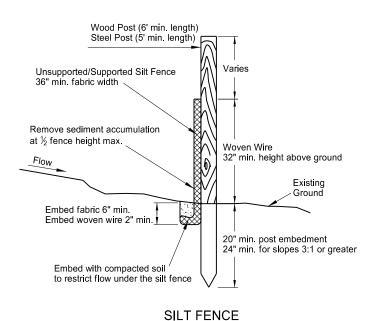
	NORTH DAKOTA MENT OF TRANSPORTATION	DEPARTM
	07-01-14	
	REVISIONS	
	CHANGE	DATE
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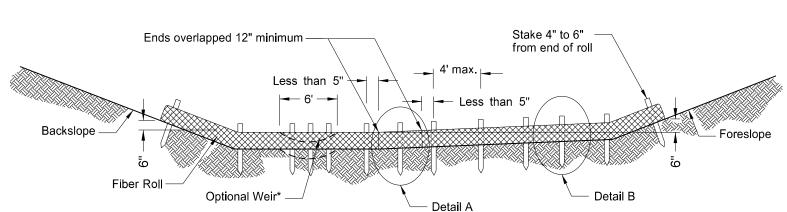




CROSS SECTION

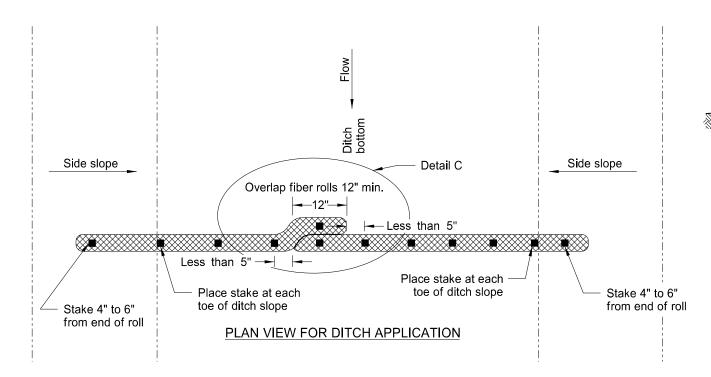
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION						
10-03-13						
REVISIONS						
DATE	CHANGE					
06-26-14	Standard drawing resulted from splitting standard D-708-2.					

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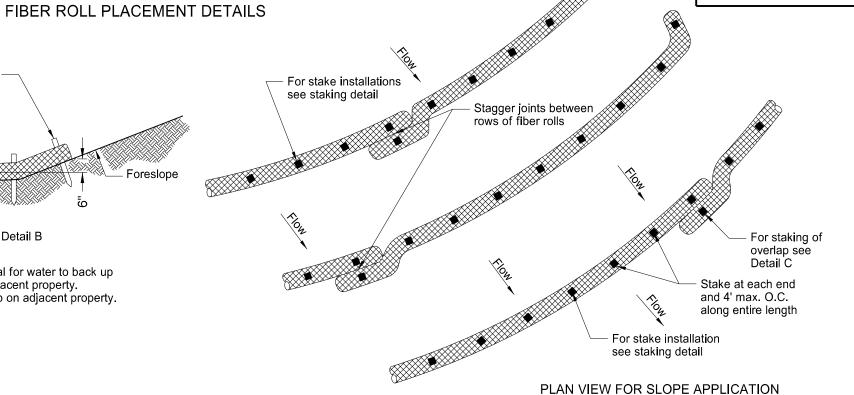


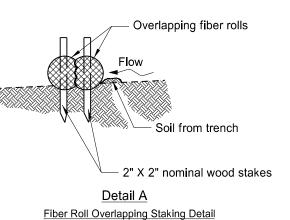
*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

12 OR 20 INCH FIBER ROLL - DITCH BOTTOM

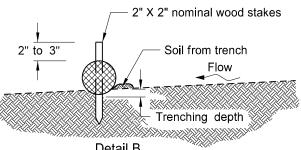


FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"





EROSION CONTROL



<u>Detail B</u> Fiber Roll Staking Detail

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION					
11-18-10					
	REVISIONS				
DATE	CHANGE				
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.				
10-04-13	Revised fiber roll overlap detail.				
06-26-14	Changed standard drawing number from D-708-7 to D-261-1				

REVISIONS

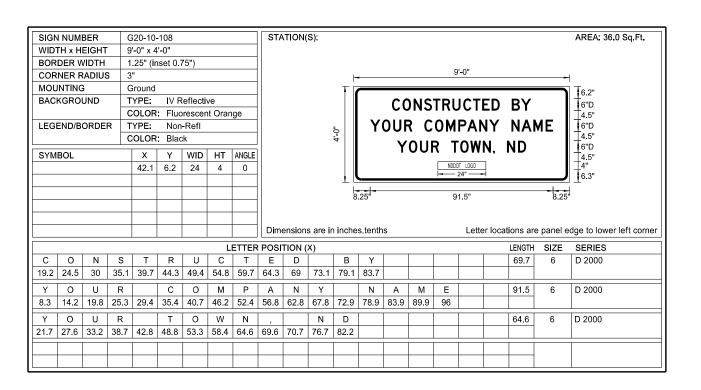
CHANGE

Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.

Revised fiber roll overlap detail. Changed standard drawing number from D-708-7 to D-261-1 documen North Dall of Tra

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D-261-1



Advance Warning Sign Spacing (A)						
Road Type	Distance between signs min. (ft)					
	А	В	С			
Urban - Low Speed (30 mph or less)	150	150	150			
Urban - Low Speed (over 30 to 40 mph)	280	280	280			
Urban - High Speed (over 40 mph to 50 mph)	360	360	360			
Rural - High Speed (over 50 mph to 65 mph)	720	720	720			
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200			
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640			

1000

1500

Interstate/4-Lane Divided

(Maintenance and Surveying)

Notes.

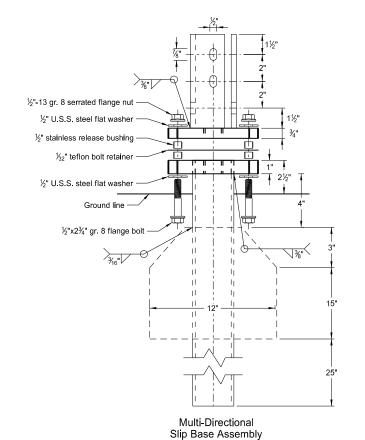
- 1. Sign shall be placed a distance of $\frac{1}{2}$ A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
- 2. Sign shall be post mounted.
- 3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
- 4. Sign shall not be placed in urban areas or within city limits.

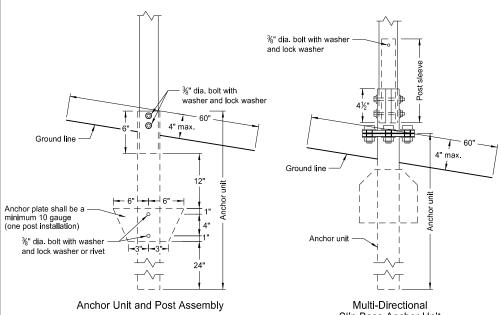
NORTH DAKOTA					
DEPARTM	MENT OF TRANSPORTATION				
	8-22-12				
	REVISIONS				
DATE	CHANGE				
7-18-14 Revise sheeting to type IV					

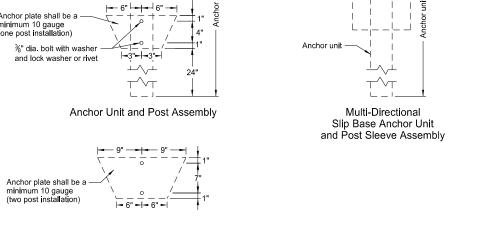
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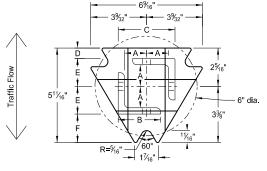
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

Perforated Tube

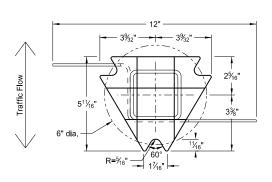




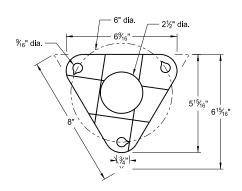




Top Post Receiver Plate - ASTM A572 grade 50 Angle Receiver - 2½"x2½"x¾" ASTM A36 structural angle



Bottom Soil Stub Tube - 3"x3"x7 gauge ASTM A500 grade B tube Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011 Plate - ASTM A572 grade 50



Bolt Retainer for Base Connection Bolt Retainer- 1/32" Reprocessed Teflon

- 1. Slip base bolts shall be torqued as specified by the manufacturer.
- 2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
- 3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
- 4. When used in concrete sidewalk, anchor shall be same except without the wings.
- 5. Four post signs shall have over 7' between the first and the fourth posts.

Telescoping Perforated Tube							
Number of Posts	Post Size in.	Wall Thick- ness Gauge	Sleeve Size in.	Wall Thick- ness Gauge	Slip Base	Anchor Size without Slip Base in.	
1	2	12			No	21/4	
1	21/4	12			No	2½	
1	2½	12			(A)	3	
1	2½	10			Yes		
1	21/4	12	2	12	Yes		
1	2½	12	21/4	12	Yes		
2	2	12			No	21/4	
2	21/4	12			No	2½	
2	2½	12			Yes		
2	2½	12			Yes		
2	21/4	10	2	12	Yes		
2	2½	12	21/4	12	Yes		
3 & 4	2½	12			Yes		
3 & 4	2½	10			Yes		
3 & 4	2½	12	21/4	12	Yes		
3 & 4	21/4	12	2	12	Yes		
3 & 4	2½	10	2¾6	10	Yes		

Properties of Telescoping Perforated Tube							
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs	Moment of Inertia in.4	Cross Sec. Area in.²	Section Modulus in.3	
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172	
2 x 2	0.105	12	2.416	0.372	0.590	0.372	
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499	
2¾ ₆ x 2¾ ₆	0.135	10	3.432	0.605	0.841	0.590	
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643	
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785	

Top Post Receiver Data Table						
Square Post Sizes (B)	А	В	С	D	Е	F
2¾ ₁₆ "x10 ga.	1%4"	2½"	31/32"	²⁵ / ₃₂ "	1 ³ % ₄ "	1%"
2½"x10 ga.	1%2"	2½"	35⁄16"	5%"	1 ² / ₃₂ "	1¾"

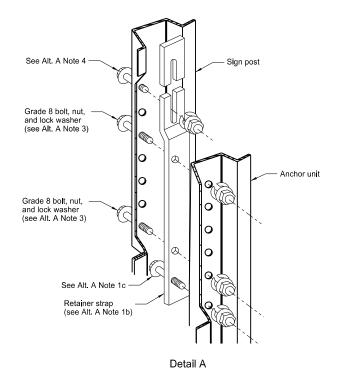
- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
- (B) The $2\frac{3}{16}$ "x10 ga. may be inserted into $2\frac{1}{2}$ "x10 ga. for additional wind load.

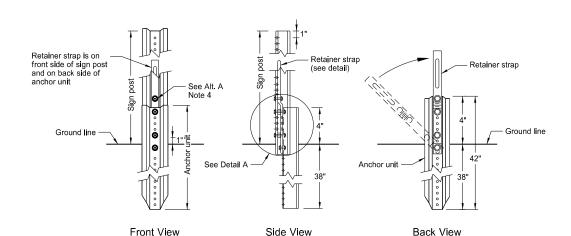
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION						
	2-28-14					
	REVISIONS					
DATE	CHANGE					

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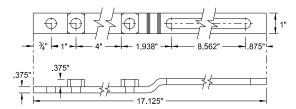
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

U-Channel Post

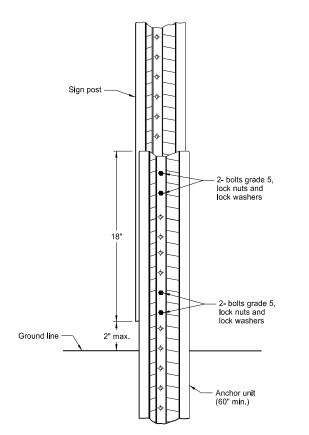




Breakaway U-Channel Detail Alternate A A maximum of 2 posts shall be installed within 7'.



Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B (2.5 and 3 lb/ft) A maximum of 3 posts shall be installed within 7'.

2- bolts grade 5, lock nuts and lock washers

2- bolts grade 5, lock nuts and lock washers

4 Anchor unit (42" min.)

Breakaway U-Channel Splice Detail
Alternate C
(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

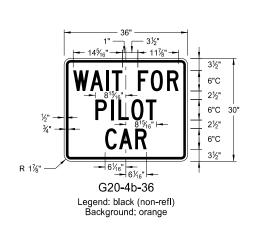
- a) Drive anchor unit to within 12" of ground level.
 b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
 c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
 d) Rotate strap 90" to left.
- a) Drive anchor unit to 4" above ground.
 b) Rotate strap to vertical position.
- a) Place 5/6"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
 b) Alternately tighten two connector bolts.
- 4. Complete assembly by tightening $\frac{1}{16}$ "x2" bolt (this fastens sign post to retainer strap).
- The base post, strap and sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the boits have full contact across the entire width.

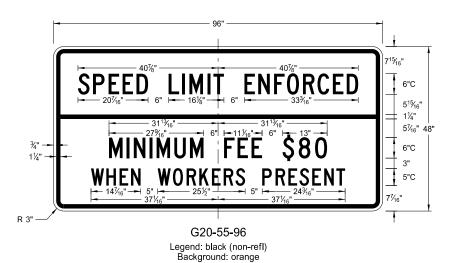
NORTH DAKOTA					
DEPARTM	MENT OF TRANSPORTATION				
2-28-14					
	REVISIONS				
DATE	CHANGE				

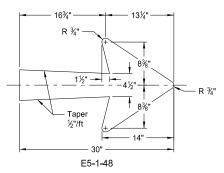
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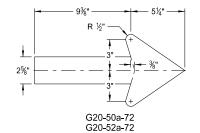
CONSTRUCTION SIGN DETAILS TERMINAL AND GUIDE SIGNS

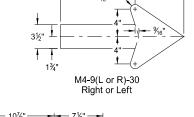


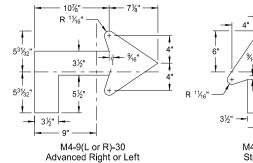


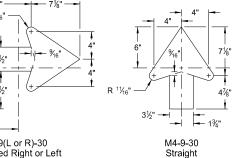












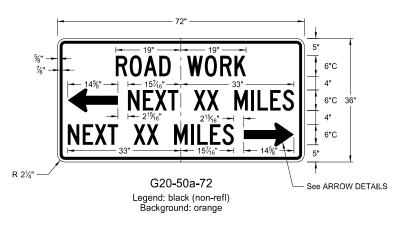
ARROW DETAILS

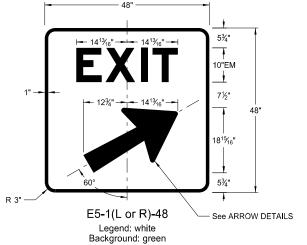
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

DEPARTI	NORTH DAKOTA DEPARTMENT OF TRANSPORTATION				
	8-13-13				
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DATE	CHANGE				
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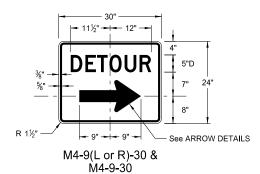






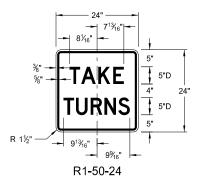






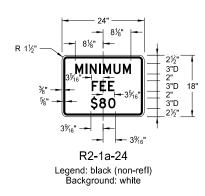
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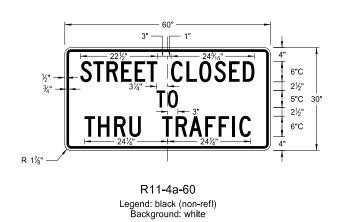
CONSTRUCTION SIGN DETAILS REGULATORY SIGNS



Legend: black (non-refl) Background: white







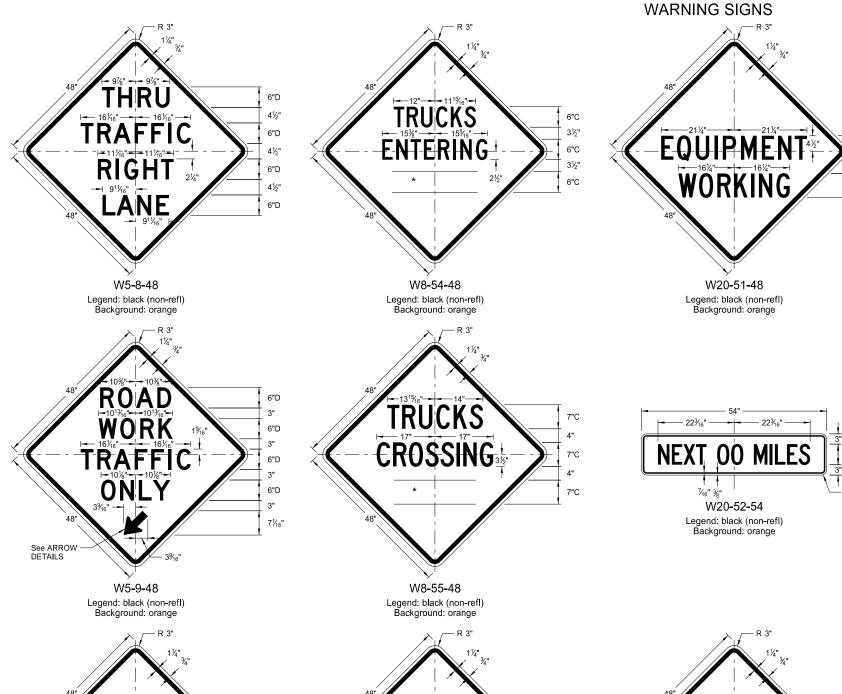


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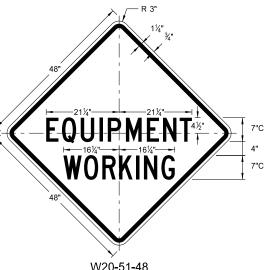
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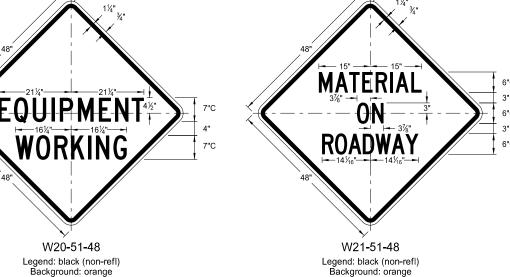
D-704-11



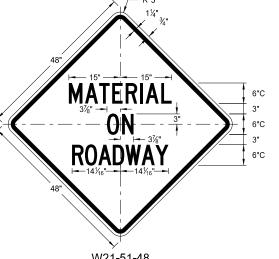
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CONSTRUCTION SIGN DETAILS

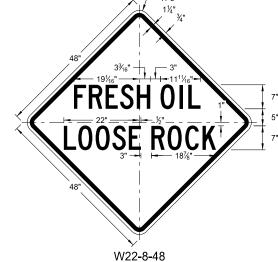


6"C 12"

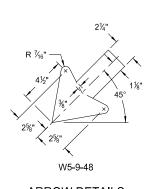


WORD LETTER SPACING AHEAD Standard 200 FT Standard 350 FT Standard Standard 1000 FT Reduce 40% 1500 FT Reduce 40% ½ MILE Reduce 50% 1 MILE Standard

* DISTANCE MESSAGES



Legend: black (non-refl) Background: orange



ARROW DETAILS

R 3" 1½" 3½" 1111½6"1	R 3" 11/4" 3/4" 11/5/16" 11/5/16" 11/5/16"
TRUCKS 15%" 15%" 6°C 3½"	TRUCKS - 12% - 12% - 3%"
15 [%] ₁ " 15 [%] ₁₆ " 3 ¹ / ₂ "	<u>12¾6"</u> 12½" → 12½" → 13½"
FNTFRING - — -) 6°C	6"C
14" 13%"	14"13%"1 3½"
HIGHWAY 2½" 6"C	HIGHWAY 6°C
	48"
W8-53-48	W8-56-48

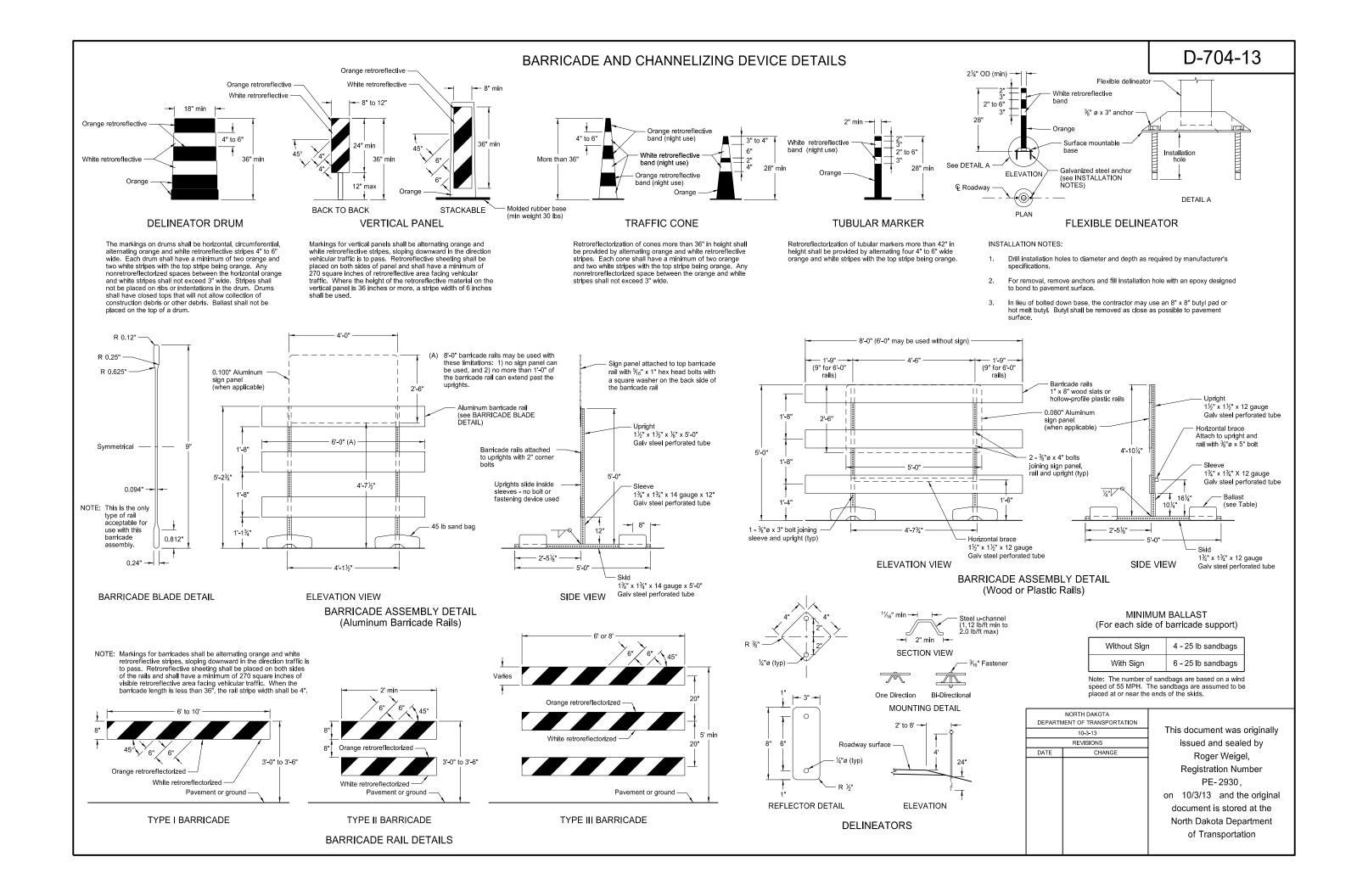
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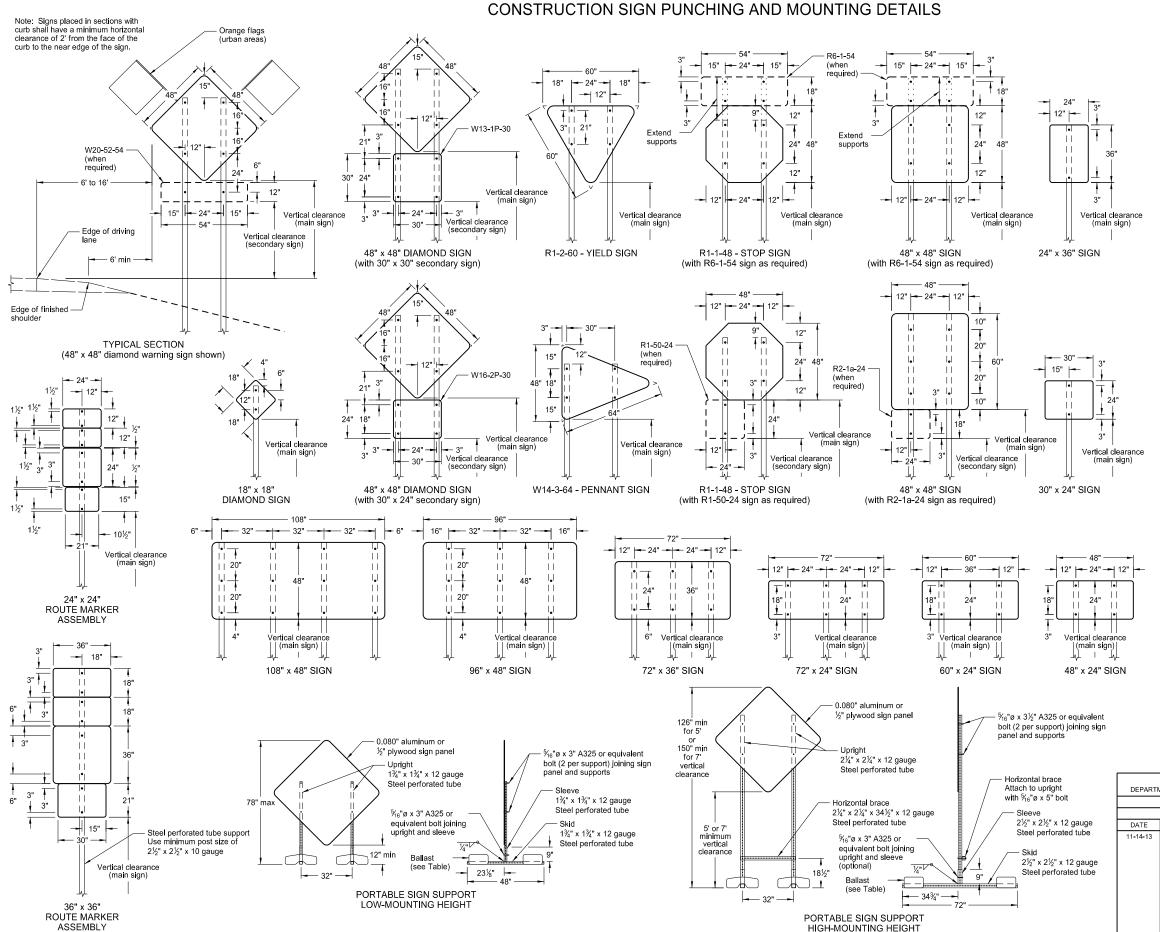


Background: orange

	NORTH DAKOTA		
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8-13-13			
REVISIONS			
DATE CHANGE			

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NOTES:

 Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on $2 \frac{1}{2}$ x $2 \frac{1}{2}$ perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

- 2. Sign Panels: Provide sign panels made of 0.100" aluminum, $\frac{1}{2}$ " plywood, or other approved material, except where noted. All holes to be punched round for $\frac{1}{2}$ " bolts.
- Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)
- Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background Interstate Business Loop - white legend on green background US and State - black legend on white background County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feel

MINIMUM BALLAST (For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

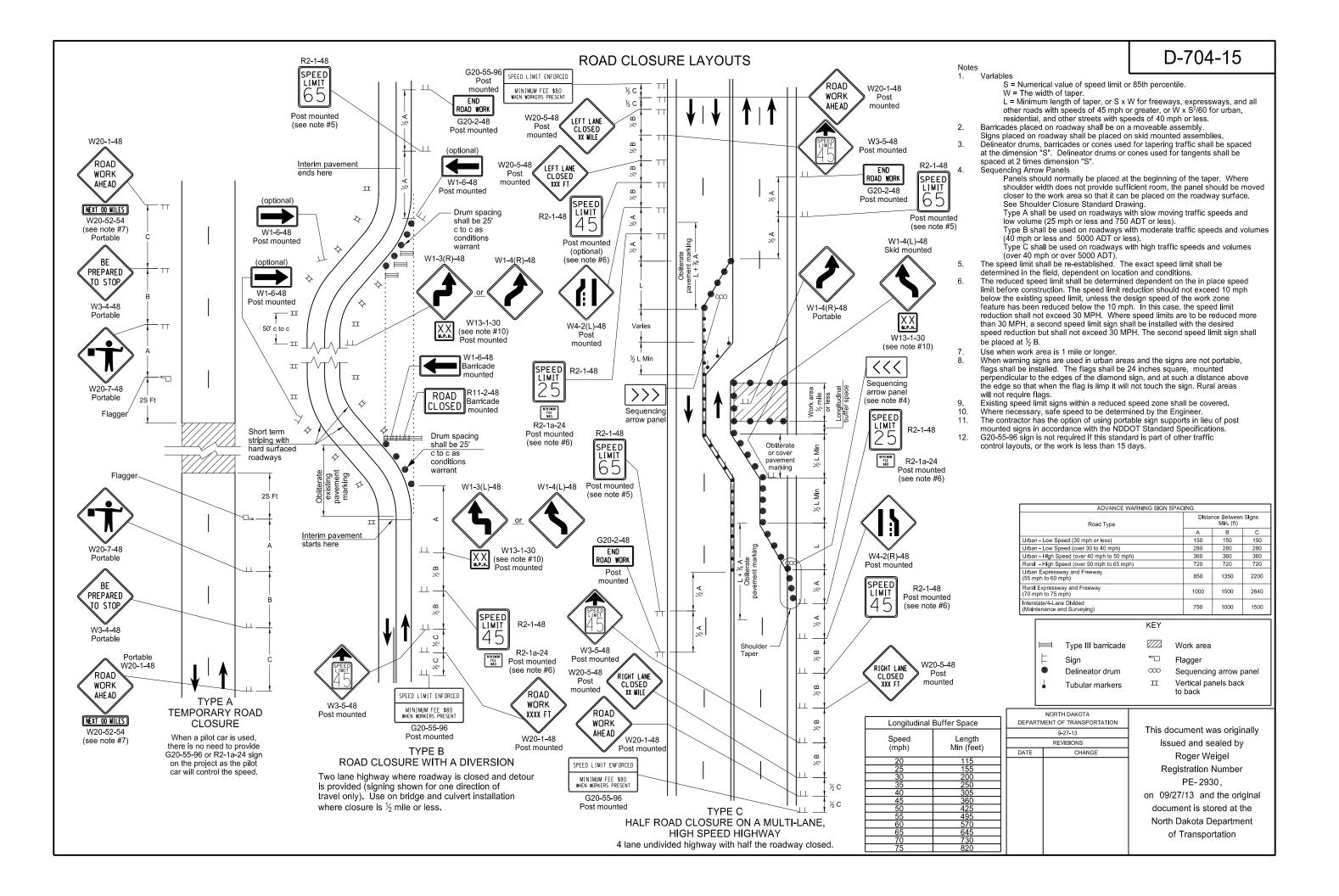
NORTH DAKOTA
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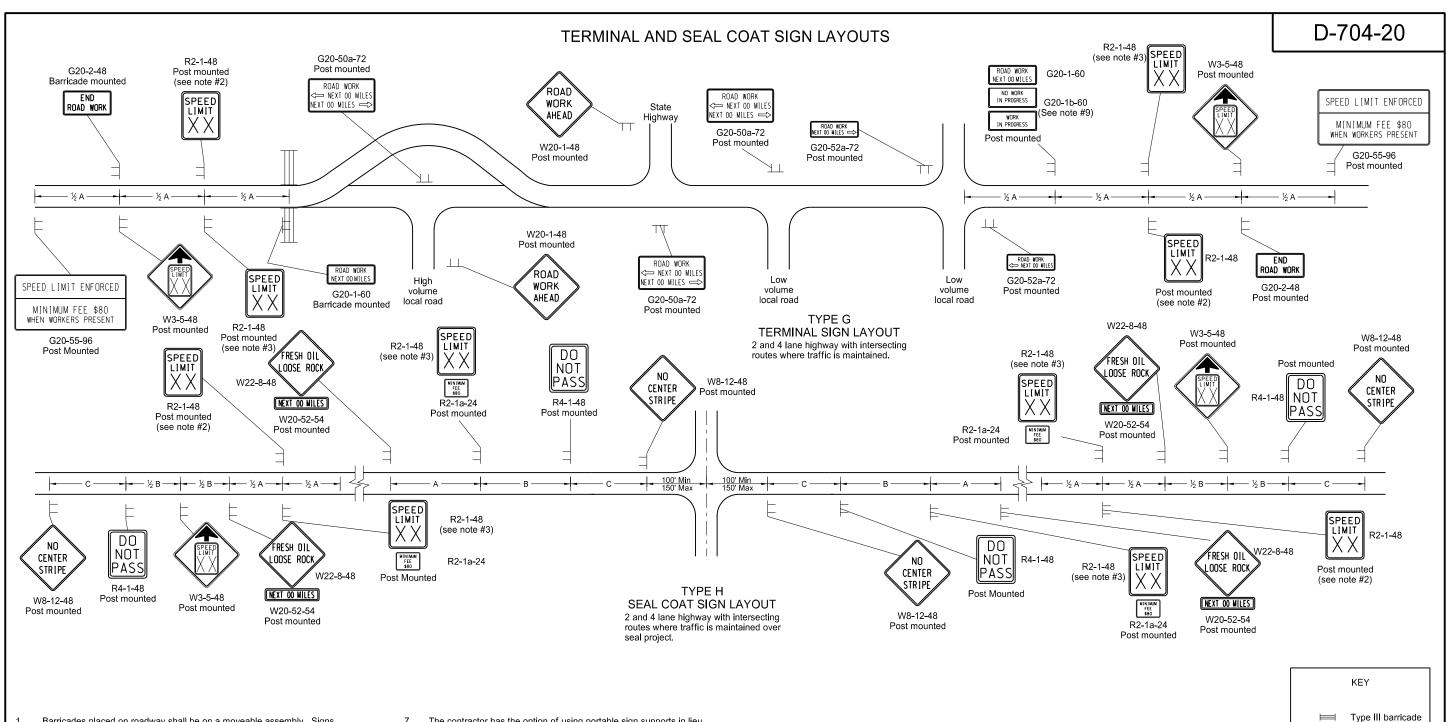
10-4-13
REVISIONS
DATE CHANGE

11-14-13 Revised Note 6.

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- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- 3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
- 4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- 5. Existing speed limit signs within a reduced speed zone shall be covered.
 6. On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.

- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- Type H construction sign traffic control shall have the speed limit signs
- covered or removed once the loose aggregate has been removed.

 9. The contractor shall install the G20-1b-60 sign when work is suspended
- Other traffic control layouts will be required in the immediate work areas.
 If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
- 11. G20-55-96 sign is not required if work is less than 15 days.

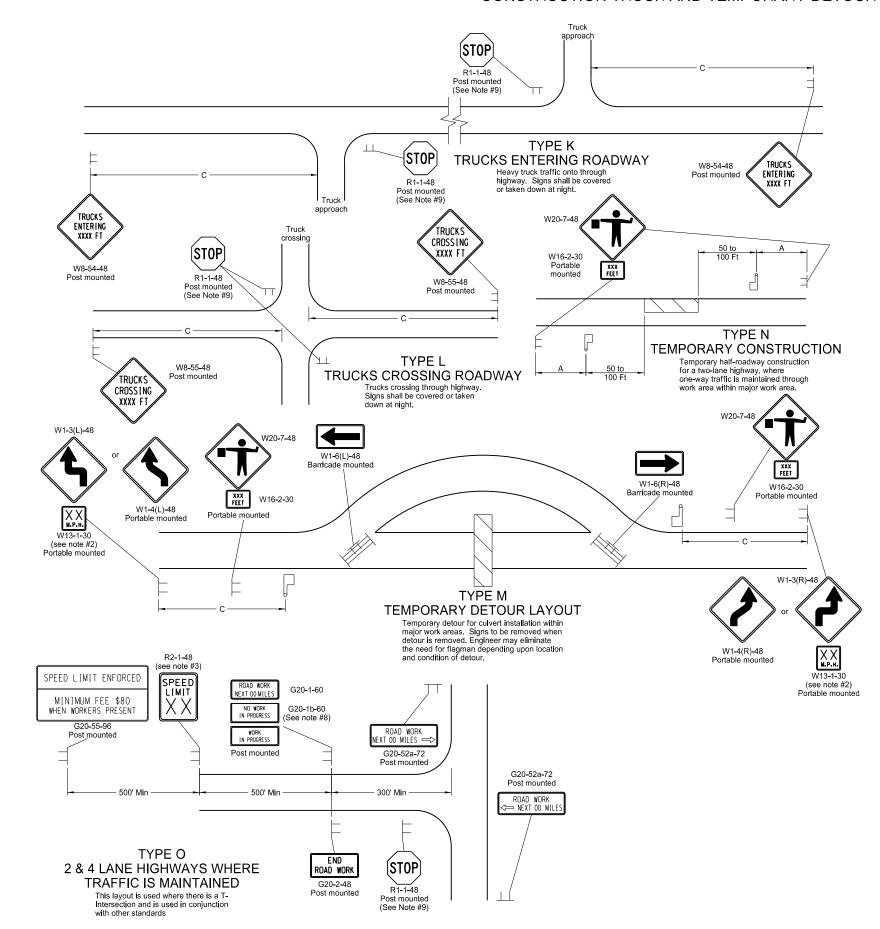
ADVANCE WARNING SIGN	SPACING			
Road Type	Distand	Distance Between Signs Min. (ft)		
	Α	В	С	
Urban - Low Speed (30 mph or less)	150	150	150	
Urban - Low Speed (over 30 to 40 mph)	280	280	280	
Urban - High Speed (over 40 mph to 50 mph)	360	360	360	
Rural - High Speed (over 50 mph to 65 mph)	720	720	720	
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200	
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640	
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500	

NORTH DAKOTA					
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Sign

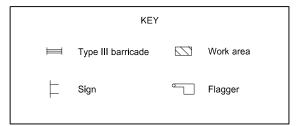
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS



Notes

- Barricades placed on roadway shall be on a moveable assembly.

 Signs placed on the roadway shall be placed on skid mounted assemblies.
- 2. Where necessary, safe speed to be determined by the Engineer.
- 3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
- 4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- 5. Existing speed limit signs within a reduced speed zone shall be covered.
- 6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
- 7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- 8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
- 9. If existing stop sign is in place, a 48" stop sign is not required.
- 10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.



ADVANCE WARNING SIGN SPACING						
Road Type	Distance Between Signs Min. (ft)					
,	А	В	С			
Urban - Low Speed (30 mph or less)	150	150	150			
Urban - Low Speed (over 30 to 40mph)	280	280	280			
Urban - High Speed (over 40 mph to 50 mph)	360	360	360			
Rural - High Speed (over 50 mph to 65 mph)	720	720	720			
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200			
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640			
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500			

	NORTH DAKOTA DEPARTMENT OF TRANSPORTATION				
		9-27-13			
ſ		REVISIONS			
	DATE	CHANGE			

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Rural Expressway and Freeway

(Maintenance and Surveying)

(70 mph to 75 mph) Interstate/4-Lane Divided 1000

750

1500

1000

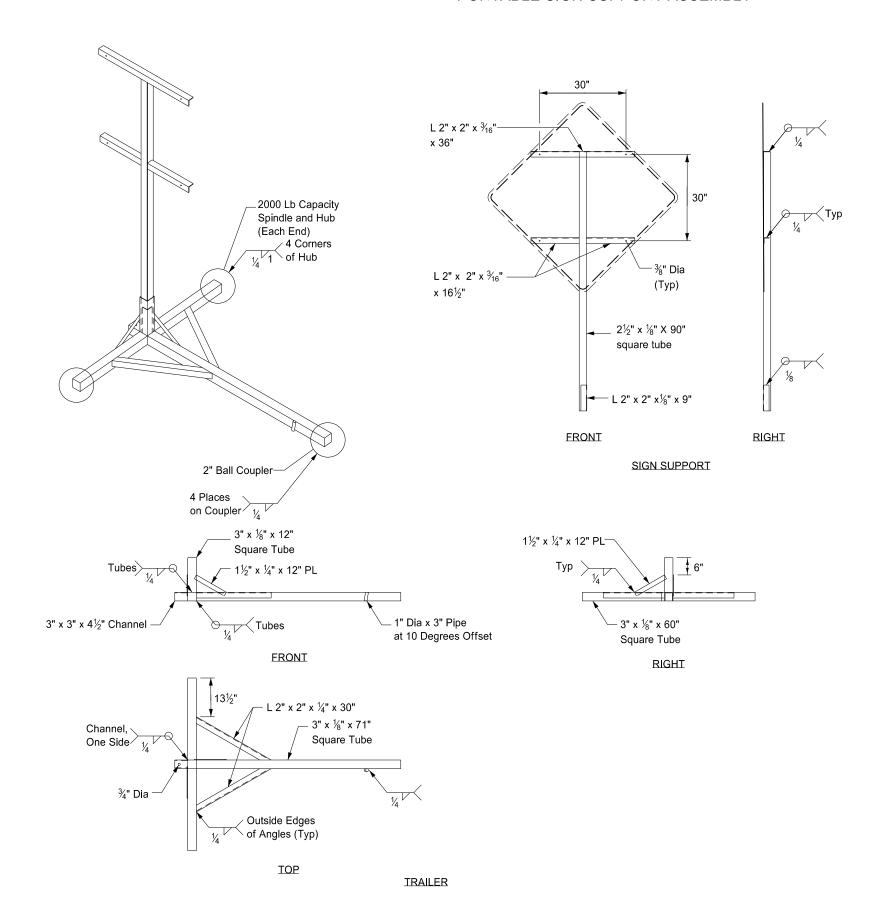
2640

1500

North Dakota Department

of Transportation

PORTABLE SIGN SUPPORT ASSEMBLY

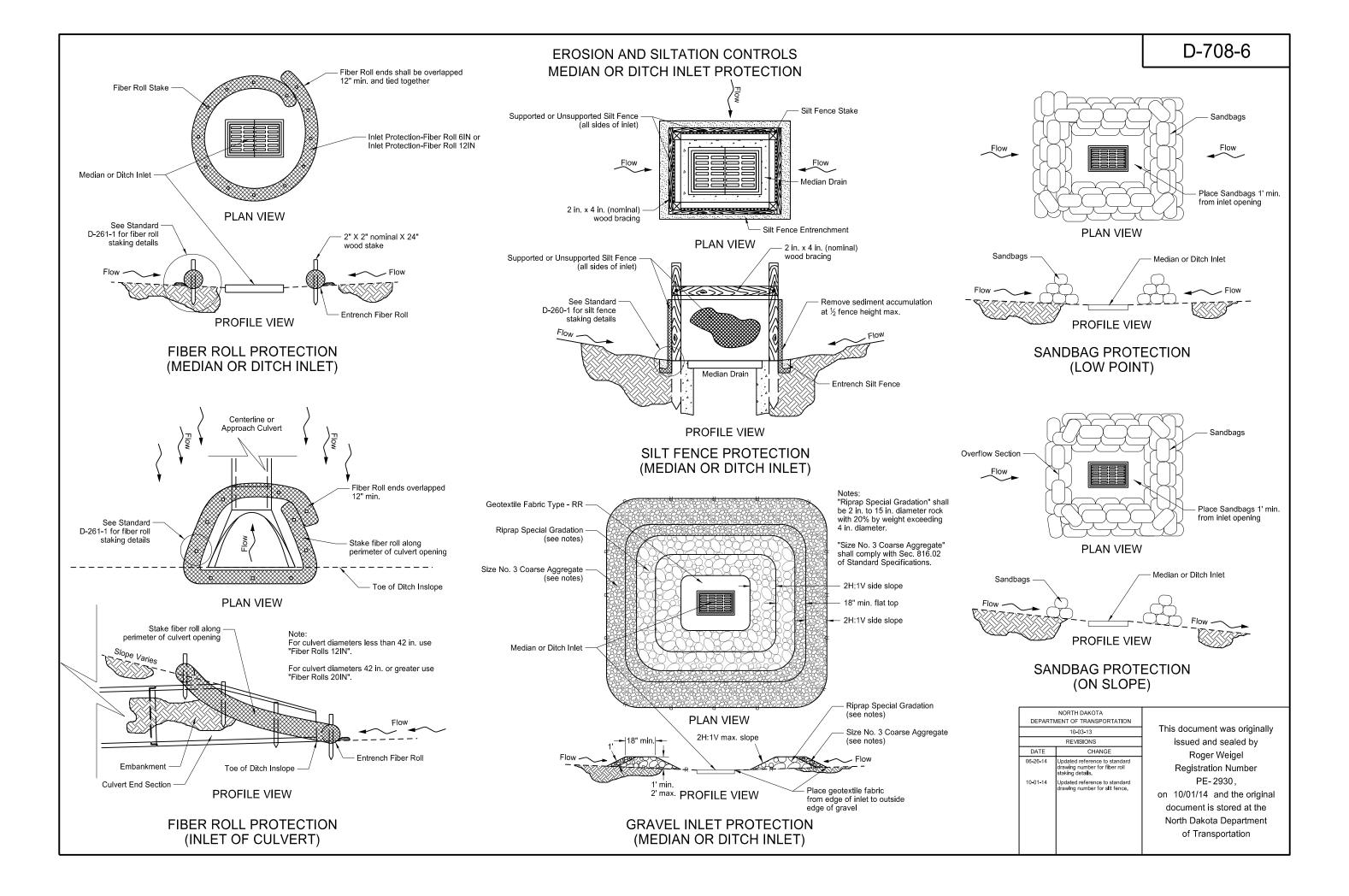


Notes:

- 1. The maximum weight of the assembly is 250 pounds.
- Use a 14" wheel and tire.
- Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
- 4. Other NCHRP 350 crash tested assemblies are acceptable.

	NORTH DAKOTA DEPARTMENT OF TRANSPORTATION			
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Registration				
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Ε

2'-0"

2'-6"

3'-0"

3'-6"

4'-0"

4'-6"

5'-0"

6'-0"

6'-6"

7'-0"

7'-6"

8'-0"

8'-6"

9'-0"

9'-6" 61/2"

U

2"

2¼"

21/2"

2¾"

3"

31/4"

31/2"

4"

41/2"

5"

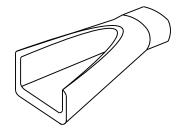
51/2"

5"

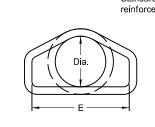
5½"

6"

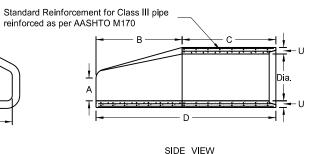
REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS (Round Pipe)

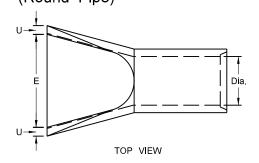


PERSPECTIVE



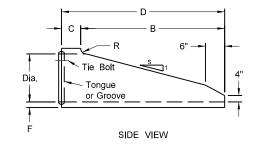
END VIEW

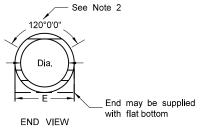




REINFORCED CONCRETE PIPE - FLARED END SECTION Reinforcement to be equivalent to Class III RCP

TRAVERSABLE END SECTION							
DIA	В	С	D	E	F	R	s
15"	4'	9"	4'-9"	1'-7½"	21/4"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	2½"	3"	6
24"	6'	1'	7'	2'-6"	3"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	4"	3"	4

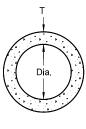




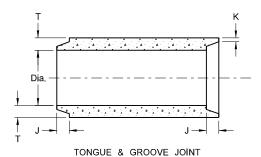
NOTES (Traversable End Section):

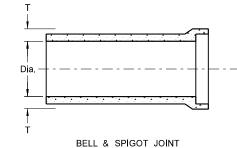
- 1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
- 2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

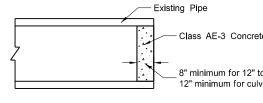
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION Reinforcement to be equivalent to Class III RCP











CIRCULAR PIPE

JOINTS FOR REINFORCED CONCRETE PIPE

- 1. All reinforcing steel shall meet AASHTO M170 requirements.
- 2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
- 3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet 66" to 108" (incl.) = not less than 6 feet
- 4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
- 5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

	24	
Existing Pipe	2	
	30	
Class AE-3 Concrete	3:	
	36	
→	4:	
8" minimum for 12" to 60" dia. culverts	4	
12" minimum for culverts 66" dia. & larger	54	
	60	
CONCRETE PIPE PLUG		
CONONETE THE TESS	7:	

		/ -0		9	9-3	_	J-0	0,2
3'-0"	7	'-61/2"	1'-	9"	9'-3½"		10'-0"	6½"
3'-5"	7	'-31/2"	2'-	0"	9'-3½"		11'-0"	6½"
	All Classifications of Round Concrete Pipe							
					_	_	4	
	Internal Dia of plpe In Inches	Cross-Sectional Water Area	Weight per lin foot of pipe Std. Wall	Joint J Groove End Min./Max	Joint K Tongue End Min.	Minimum Wall Thickness (T)		
	Dia	Sq. ft.	Lbs.	In.	ln.	In.		
	12	0.79	92	15/8-23/8	3/4	2]	
	15	1.23	127	1¾-2¾	7∕8	21/4]	
	18	1.77	168	11/8-21/8	1	21/2		
	21	2.40	214	11/8-31/8	11/8	2¾		
	24	3.14	265	23/4-33/4	11//8	3		
	27	3.98	322	23/4-4	11/4	31/4		
	30	4.91	384	31/4-41/4	11/4	31/2		
	33	5.94	452	31/4-41/4	1½	3¾		
	36	7.07	524	31/4-41/4	11/2	4		
	42	9.62	685	33/4-43/4	13/4	4½		
	48	12,57	685	35/8-43/4	17/8	5		
	54	15.90	1070	41/8-51/4	2	5½		
	60	19.63	1296	41/2-51/2	21/4	6		
	66	23.76	1542	5-6	25/8	6½		
	72	28.27	1810	5%-63/4	2½	7		
							1	

33.18 2098 61/4-71/4 21/8 71/2

38.48 2410 55/8-73/4 33/8 8 44.18 2793 63/4-81/2 31/8 81/2 50.27 3092 7-81/4 31/2 9 56.75 3466 7-81/4 31/2 91/2 108 63.62 3864 71/4-81/2 33/4 10

FLARED END SECTION

TERMINAL DIMENSIONS

С

4'-01/8"

3'-10"

3'-10"

3'-1"

2'-6"

2'-11/2"

1'-7¾"

2'-9"

2'-9"

2'-0"

2'-9¼"

3'-3"

2'-3"

1'-9"

1'-9"

D

6'-01/8"

6'-1"

6'-1"

6'-1"

6'-11/5"

6'-11/2"

6'-1¾"

8'-0"

8'-0"

8'-0"

8'-21/4"

8'-3"

8'-3"

8'-3"

9'-3"

DIA

12 15

18

21

24 27

30

36

42

48

54

60

66

72

78

84

90

Α

0'-4"

0'-6"

0'-9"

0'-9"

0'-91/2"

0'-101/2"

1'-0"

1'-3"

1'-9"

2'-0"

2'-3"

2'-11"

2'-6" 3'-0"

3'-0"

В

2'-0"

2'-3"

2'-3"

3'-0"

3'-71/2"

4'-0"

4'-6"

5'-3"

5'-3"

6'-0"

5'-5"

5'-0"

6'-0"

6'-6"

7'-6"

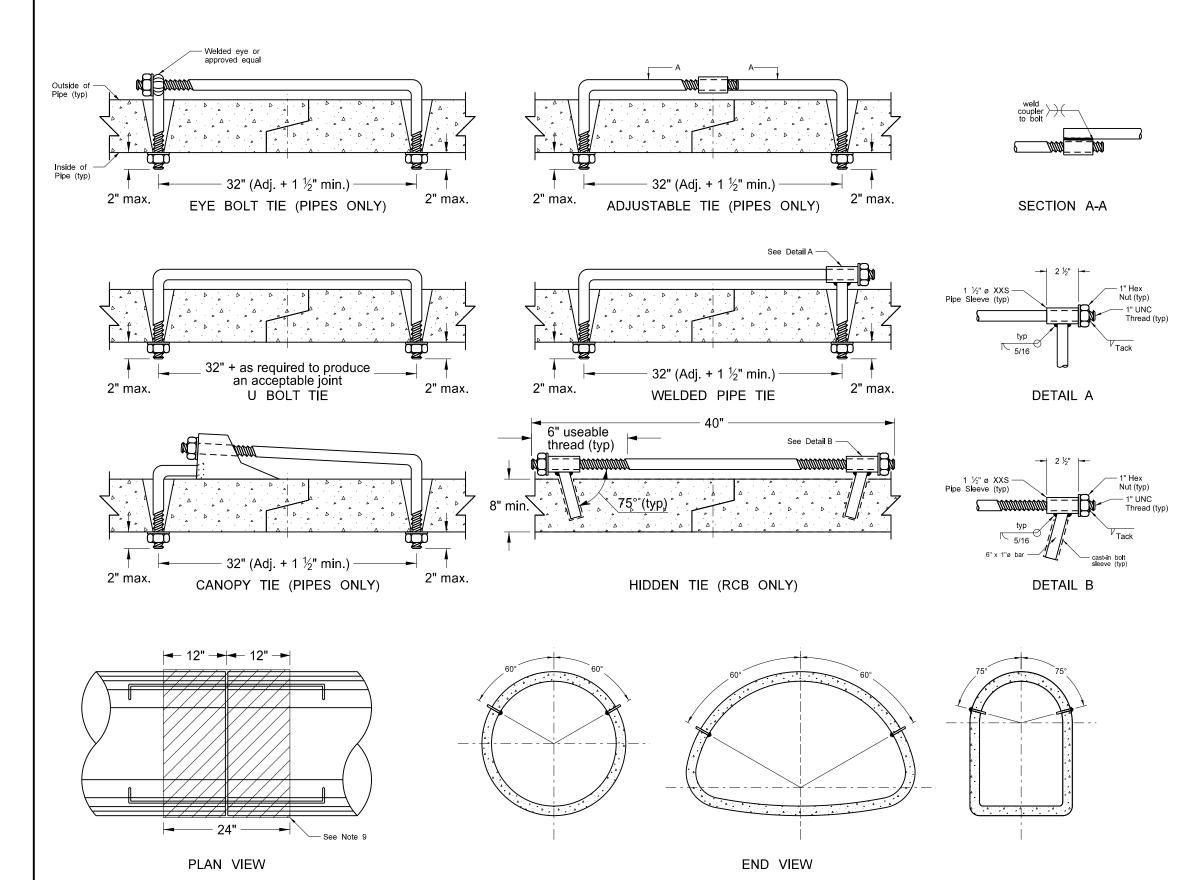
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION					
05-12-14					
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DATE CHANGE					
01-21-15	Revised Note 5				

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CONCRETE PIPE OR PRECAST CONCRETE BOX CULVERT TIES



REQUIRED SIZE OF TIE BOLTS						
Pipe Size	Thread ø	XXS Pipe Sleeve Inner ø				
18" - 24"	5/8" See note 2	3/4"				
30" - 66"	3/4"	1"				
72" - 78"	1"	1 1/2"				
RCB	'	1 74				

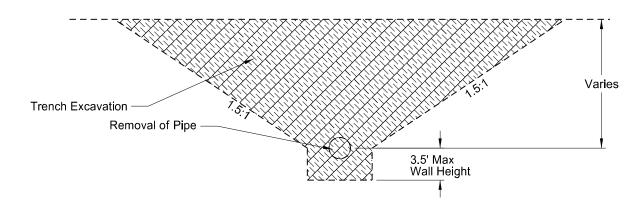
NOTES:

- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
- Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
- 3. Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
- Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
- 5. Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter ¼" larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 ¼".
- The contractor has the option of selecting the type of tie bolt used from those shown.
- The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for the appropriate conduit or RCB pay item.
- 8. All centerline and approach RCP culvert joints shall be tied. Storm drain systems shall have the first three joints including the end section of all free ends tied. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
- When joint wrap is specified in the plans, place wrap beneath ties. Overlap the joint by 12" in both directions.
- Tie bolts shall conform to ASTM A 36. Nuts shall be be heavy hex and conform to ASTM A 563. Washers shall conform to ASTM F 436, Type 1. Welded pipe sleeves and cast-in bolt sleeves shall conform to ASTM A 53, Grade B.
- 11. Cattle Pass and Jacked and Bored pipes shall have pipe ties inserted from the inside of the pipes and grouted into place. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
- 12. RCB tie locations shall be as shown on the plans.

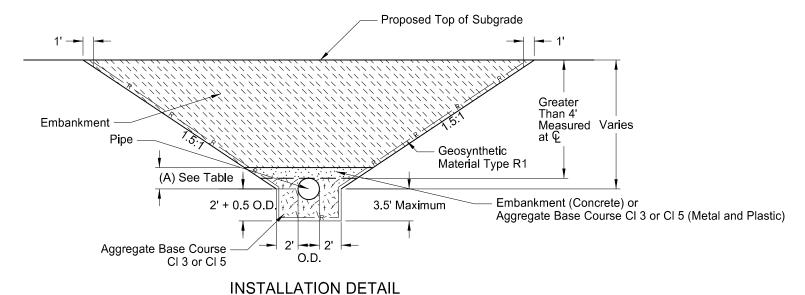
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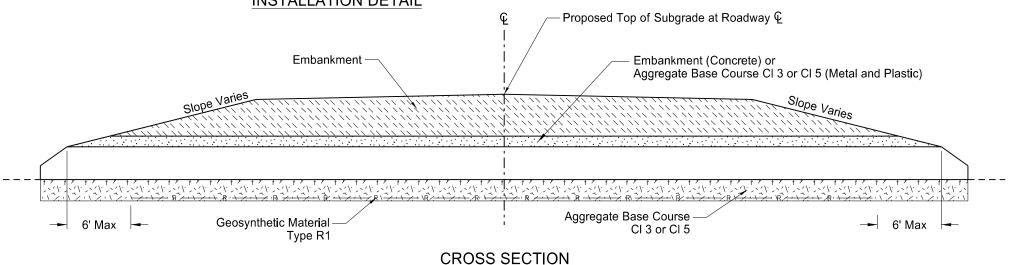
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TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE



EXCAVATION DETAIL





Pay Items 1) Pipe*

- 2) Geosynthetic Material Type R13) Removal of Pipe (if required)

*Included in Pipe Pay Item

- 2) Trench excavation
- 3) Aggregate Base Course Cl 3 or Cl 5 4) Embankment

NOTES:

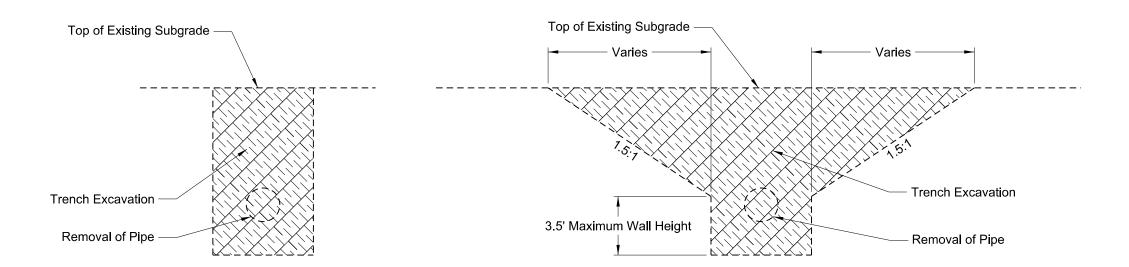
- 1) This drawing applies to new/replaced mainline and paved intersection roadways (including ramps). It does not include pipes in approaches.
- 2) Embankment may be either Borrow Excavation or Common Excavation - Type A

Backfill Dimensions		
Pipe Materials	Dimension (A)	
Concrete	0.5 O.D.	
Metal and Plastic	0.5 O.D. + 1 Foot	

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 7-26-13 REVISIONS DATE 10-15-13 1-21-14 9-18-15 12-10-15 Label Formatting Nomenclature Title Rewording Added Plastic Pipe

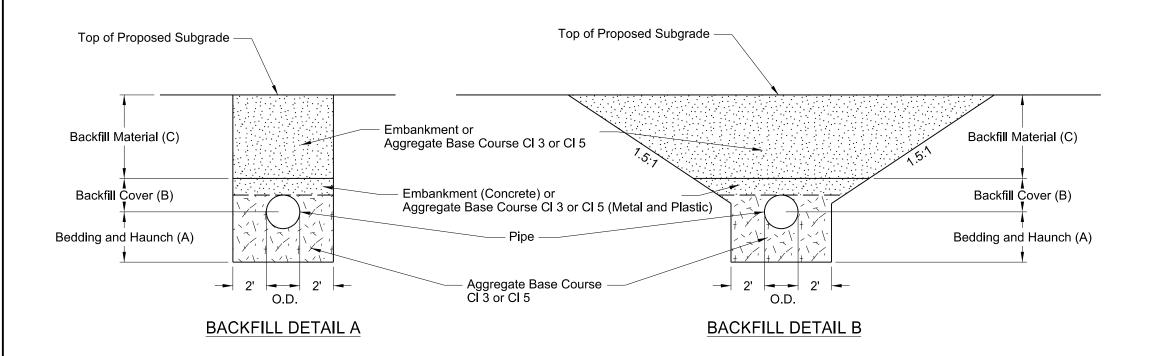
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PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE OR PIPE NOT UNDER THE ROADWAY



EXCAVATION DETAIL A

EXCAVATION DETAIL B



Pay Items 1) Pipe*

- 2) Removal of Pipe (if required)

*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Aggregate base course CI 3 or CI 5
- 4) Embankment

NOTES:

- 1) This drawing does not apply to pipes in approaches.
- 2) It is the contactor's option to select Detail A or B.
- 3) Embankment may be either Borrow Excavation or Common Excavation - Type A

Bedding and Haunch (A)		
Pipes Not Under Roadway = 0.5 O.D. + 4 Inches		
Pipes Under the Roadway = 0.5 O.D. + 2 Feet		
Backfill Cover (B)		
Concrete Pipe = 0.5 O.D.		
Metal and Plastic = 0.5 O.D. + 1 Foot		
Backfill Material (C)		
Top of Pipe 4 Feet or Less Below the Top of Proposed		
Subgrade = Aggregate Base Course Cl3 or Cl 5		
Top of Pipe Greater than 4 Feet Below the Top of Proposed		
Subgrade = Common Excavation - Type A		

Pipe Not Under Roadway = Common Excavation - Type B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION				
7-26-13				
REVISIONS				
DATE	CHANGE			
10-15-13 1-21-15 12-10-15	Label Formatting Nomenclature Added Plastic Pipe			

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